

















# THE IMPERIAL ENCYCLOPEDIA AND DICTIONARY

---

---

A LIBRARY OF UNIVERSAL  
KNOWLEDGE AND AN UN-  
ABRIDGED DICTIONARY OF  
THE ENGLISH LANGUAGE  
UNDER ONE ALPHABET

---

---

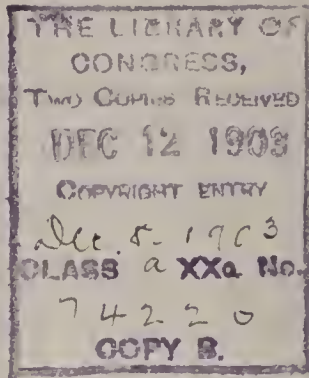
IN FORTY VOLUMES

VOLUME 40  
WIGTOWN--ZYMURGY

---

NEW YORK HENRY G. ALLEN & COMPANY

AE5  
.I34



Copyright, 1891, 1895, 1897, 1903,  
BY  
GARRETSON, COX & COMPANY.



# SCHEME OF SOUND SYMBOLS

## FOR THE PRONUNCIATION OF WORDS.

*Note.*—(·) is the mark dividing words respelt phonetically into syllables; ('), the accent indicating on which syllable or syllables the accent or stress of the voice is to be placed.

Sound-symbols employed in Respelling.	Representing the Sounds as exemplified in the Words.	Words respelt with Sound-symbols and Marks for Pronunciation.
ā...	mate, fate, fail, aye.....	māt, fāt, fāl, ā.
ǎ...	mat, fat.....	măt, făt.
â...	far, calm, father.....	fâr, kâm, fâ'thēr.
ǎ...	care, fair.....	câr, fâr.
aw...	fall, laud, law.....	fawl, lawd, law.
ē...	mete, meat, feet, free.....	mēt, mêt, fêt, frē.
ě...	met, bed.....	mêt, bĕd.
é...	her, stir, heard, cur.....	hēr, stēr, hĕrd, kēr.
î...	pine, ply, height.....	pîn, plî, hît.
ĩ...	pin, nymph, ability.....	pîn, nîmf, â-bîl'ĩ-tî.
ō...	note, toll, soul.....	nôt, tōl, sōl.
ö...	not, plot.....	nôt, plôt.
ô...	move, smooth.....	môv, smôth.
ö...	Goethe (similar to <i>e</i> in her)...	gö'teh.
ow...	noun, bough, cow.....	noun, bow, kow.
oy...	boy, boil.....	boy, boyl.
û...	pure, dew, few.....	pûr, dû, fû.
ÿ...	bud, come, tough.....	bûd, kûm, tûf.
ú...	full, push, good.....	fûl, pûsh, gûd.
ü...	French plume, Scotch guid.....	plûm, gûd.
ch...	chair, match.....	châr, mǎch.
ch...	German buch, Heidelberg, Scotch loch (guttural).....	bóch, hî'del-bĕrch, lôch.
g...	game, go, gun.....	gām, gō, gŭn.
g...	judge, gem, gin.....	jŭj, jĕm, jîn.
k...	king, cat, cot, cut.....	kîng, kăt, kôt, kŭt.
s...	sit, scene, cell, city, cypress.....	sît, sĕn, sĕl, sît'î, sî'prĕs.
sh...	shun, ambition.....	shŭn, âmbîsh'ŭn.
th...	thing, breath.....	thîng, brĕth.
th...	though, breathe.....	thō, brĕth.
z...	zeal, maze, muse.....	zĕl, mǎz, mûz.
zh...	azure, vision.....	ǎzh'er, vîzh'ŭn.



# ABBREVIATIONS USED IN THIS WORK.

a., or adj....adjective	A.U.C.....in the year of the building of the city (Rome)[ <i>Annourbis conditæ</i> ]
A.B.....Bachelor of Arts	Aug.....August
abbr.....abbreviation, abbrevi- ated	aug.....augmentative
abl. or abla.ablative	Aust.....Austrian
Abp.....Archbishop	A. V.....authorized version [of Bible, 1611]
abt.....about	avoir.....avoirdufois
Acad.....Academy	B.....Boron
acc. or ac..accusative	B.....Britannic
accom.....accommodated, ac- commodation	b.....born
act.....active	Ba.....Barium
A.D.....in the year of our Lord [ <i>Anno Dom- ini</i> ]	Bart.....Baronet
Adj. ....Adjutant	Bav.....Bavarian
Adm.....Admiral	bl.; bbl....barrel; barrels
adv. or ad..adverb	B.C.....before Christ
A. F.....Anglo-French	B.C.L... ..Bachelor of Civil Law
Ag.....Silver [ <i>Argentum</i> ]	B.D.....Bachelor of Divinity
agri.....agriculture	bef.....before
A. L.....Anglo-Latin	Belg.....Belgic
Al.....Aluminium	Beng.....Bengali
Ala.....Alabama	Bi.....Bismuth
Alb.....Albanian	biog.....biography, biograph- ical
alg.....algebra	biol.....biology
A.M.....before noon [ <i>ante meridiem</i> ]	B.L.....Bachelor of Laws
A.M. ....Master of Arts	Bohem....Bohemian
Am.....Amos	bot.....botany, botanical
Amer.....America, -n	Bp.....Bishop
anat.....anatomy, anatomical	Br.....Bromine
anc.....ancient, anciently	Braz.....Brazilian
AN. M. ....in the year of the world [ <i>Anno Mundi</i> ]	Bret.....Breton
anon.....anonymous	Brig.....Brigadier
antiq.....antiquity, antiqui- ties	Brit.....British, Britannica
aor.....aorist, -ic	bro.....brother
app.....appendix	Bulg.....Bulgarian
appar.....apparently	bush.....bushel, bushels
Apr.....April	C.....Carbon
Ar.....Arabic	c.....century
arch.....architecture	Ca.....Calcium
archæol...archæology	Cal.....California
arith.....arithmetic	Camb.....Cambridge
Ariz.....Arizona	Can.....Canada
Ark.....Arkansas	Cant.....Canterbury
art.....article	cap.....capital
artil.....artillery	Capt.....Captain
AS.....Anglo-Saxon	Card... ..Cardinal
As.....Arsenic	carp.....carpentry
Assoc.....Association	Cath.....Catholic
asst.....assistant	caus.....causative
astrol.....astrology	cav.....cavalry
astron... ..astronomy	Cd.....Cadmium
attrib.....attributive	Ce.....Cerium
atty.....attorney	Celt.....Celtic
at. wt.....atomic weight	cent.....central
Au.....Gold [ <i>Aurum</i> ]	cf.....compare [ <i>confer</i> ]
	ch or chh...church



# ABBREVIATIONS.

Chal.....	Chaldee	diff.....	different, difference
chap.....	chapter	dim.....	diminutive
chem.....	chemistry, chemical	dist....	district
Chin.....	Chinese	distrib..	distributive
Chron.....	Chronicles	div.....	division
chron.....	chronology	doz.....	dozen
Cl.....	Chlorine	Dr.....	Doctor
Class.....	Classical [= Greek and Latin]	dr.....	drain, drams
Co.....	Cobalt	dram.....	dramatic
Co.....	Company	Dut. or D..	Dutch
co....	county	dwt.....	pennyweight
cog.....	cognate [with]	dynam or	
Col.....	Colonel	dyn.....	dynamics
Col.....	Colossians	E.....	Erbium
Coll.....	College	E. or e....	East, -ern, -ward
colloq.....	colloquial	E. or Eng..	English
Colo.....	Colorado	Eccl.....	Ecclesiastes
Com.....	Commodore	eccl. or	ecclesiastical [af-fairs]
com.....	commerce, commercial	eccles....	
com.....	common	ed.....	edited, edition, editor
comp.....	compare	e.g.....	for example [ex gratia]
comp.....	composition, compound	E. Ind. or	East Indies, East
compar....	comparative	E. I....	
conch.....	conchology	elect.....	electricity
cong.....	congress	Emp..	Emperor
Congl.....	Congregational	Encyc.....	Encyclopedia
conj.....	conjunction	Eng. or E..	English
Conn or Ct.	Connecticut	engin.....	engineering
contr.....	contraction, contracted	entom....	entomology
Cop.....	Coptic	env. ext....	envoy extraordinary
Cor.....	Corinthians	ep.....	epistle
Corn.....	Cornish	Eph.....	Ephesians
corr.....	corresponding	Episc.....	Episcopal
Cr.....	Chromium	eq. or =...	equal, equals
crystal....	crystallography	equiv.....	equivalent
Cs.....	Cæsium	esp.....	especially
ct.....	cent	Est.....	Esther
Ct. or Conn.	Connecticut	estab.....	established
Cu.....	Copper [Cuprum]	Esthon....	Esthonian
cwt.....	a hundred weight	etc.....	and others like [et cetera]
Cyc.....	Cyclopedia	Eth.....	Ethiopic
D.....	Didymium	ethnog....	ethnography
D. or Dut..	Dutch	ethnol....	ethnology
d.....	died	et seq.....	and the following [et sequentia]
d. [l. s. d.]	penny, pence	etym.....	etymology
Dan.....	Daniel	Eur.....	European
Dan.....	Danish	Ex.....	Exodus
dat.....	dative	exclam....	exclamation
dau.....	daughter	Ezek.....	Ezekiel
D. C.....	District of Columbia	Ezr.....	Ezra
D.C.L.....	Doctor of Civil [or Common] Law	F.....	Fluorine
D.D.....	Doctor of Divinity	F. or Fahr.	Fahrenheit
Dec.....	December	f. or fem..	feminine
dec.....	declension	F. or Fr....	French
def.....	definite, definition	fa.....	father
deg.....	degree, degrees	Fahr. or F.	Fahrenheit
Del.....	Delaware	far.....	farriery
del.....	delegate, delegates	Fe.....	Iron [Ferrum]
dem.....	democratic	Feb.....	February
dep.....	deputy	fem or f..	feminine
dep.....	deponent	fig.....	figure, figuratively
dept.....	department	Fin.....	Finnish
deriv.....	derivation, derivative	F.—L.....	French from Latin
Deut.....	Deuteronomy	Fla.....	Florida
dial.....	dialect, dialectal	Flem.....	Flemish
diam....	diameter	for.....	foreign
Dic.....	Dictionary	fort.....	fortification
		Fr. or F....	French
		fr.....	from

# ABBREVIATIONS.

freq.....frequentative	ind.....indicative
Fris.....Frisian	indef.....indefinite
ft.....foot, feet	Indo-Eur...Indo-European
fut.....future	inf.....infantry
G. or Ger...German	inf or infin.infinite
G.....Glucinium	instr.....instrument, -al
Ga.....Gallium	int... interest
Ga.....Georgia	intens.....intensive
Gael.....Gaelic	interj. or
Gal.....Galatians	int.....interjection
gal.....gallon	interrog...interrogative pro-
galv.....galvanism, galvanic	noun
gard.....gardening	intr. or
gen.....gender	intrans..intransitive
Gen.....General	Io... Iowa
Gen.....Genesis	Ir.....Iridium
gen.....genitive	Ir.....Irish
Geno.....Genoese	Iran.....Iranian
geog.....geography	irr.....irregular, -ly
geol.....geology	Is.....Isaiah
geom.....geometry	It.....Italian
Ger.....German, Germany	Jan.....January
Goth.....Gothic	Jap.....Japanese
Gov.....Governor	Jas.....James
govt.....government	Jer.....Jeremiah
Gr.....Grand, Great	Jn.....John
Gr.....Greek	Josh.....Joshua
gr.....grain, grains	Jr.....Junior
gram.....grammar	Judg.....Judges
Gr. Brit...Great Britain	K.....Potassium [ <i>Kalium</i> ]
Gris.....Grisons	K.....Kings [in Bible]
gun.....gunnery	K.....king
H.....Hegira	Kan.....Kansas
H.....Hydrogen	Kt.....Knight
h.....hour, hours	Ky.....Kentucky
Hab.....Habakkuk	L.....Latin
Hag.....Haggai	L.....Lithium
H. B. M....His [or Her] Britan- nic Majesty	l. [l. s. d.], { pound, pounds or £..... } [sterling]
Heb.....Hebrew, Hebrews	La.....Lanthanum
her.....heraldry	La.....Louisiana
herpet.....herpetology	Lam.....Lamentations
Hg.....Mercury [ <i>Hydrar- gyrum</i> ]	Lang.....Languedoc
hhd.....hog-head, hogsheads	lang... language
Hind.....Hindustani, Hindu, or Hindi	Lap.....Lapland
hist.....history, historical	lat.....latitude
Hon.....Honorable	lb.; llb. or { pound; pounds lbs..... } [weight]
hort.....horticulture	Let.....Lettish
Hos.....Hosea	Lev.....Leviticus
Hung.....Hungarian	LG.....Low German
Hydros.....Hydrostatics	L.H.D.....Doctor of Polite Lit- erature
I.....Iodine	Lieut.....Lieutenant
I.; Is.....Island; Islands	Lim.....Limousin
Icel.....Icelandic	Lin.....Linnæus, Linnæan
ichth.....ichthyology	lit.....literal-ly
Ida.....Idaho	lit.....literature
i.e.....that is [ <i>id est</i> ]	Lith.....Lithuanian
Ill.....Illinois	lithog.....lithograph. -y
illus.....illustration	LL.....Late Latin, Low Latin
impera or	LL.D.....Doctor of Laws
impr.....imperative	long.....longitude
impers.....impersonal	Luth.....Lutheran
impf or imp imperfect	M.....Middle
impf. p. or	M.....Monsieur
imp.....imperfect participle	m.....mile, miles
improp.....improperly	m. or masc. masculine
In.....Indium	M.A.....Master of Arts
in.....inch, inches	Macc.....Maccabees
incept.....inceptive	mach... machinery
Ind.....India. Indian	Meg.....Magazine
Ind.....Indiana	

# ABBREVIATIONS.

<b>Maj.</b> .....Major	<b>N. A., or</b>
<b>Mal.</b> .....Malachi	<b>N. Amer.</b> North America, -n
<b>Mal.</b> .....Malay, Malayan	<b>nat.</b> .....natural
<b>manuf.</b> .....manufacturing, manufacturers	<b>naut.</b> .....nautical
<b>Mar.</b> .....March	<b>nav.</b> .....navigation, naval af- fairs
<b>masc or m.</b> masculine	<b>Nb.</b> .....Niobium
<b>Mass.</b> .....Massachusetts	<b>N. C. or</b>
<b>math.</b> .....mathematics, math- ematical	<b>N. Car.</b> ...North Carolina
<b>Matt.</b> .....Matthew	<b>N. D.</b> .....North Dakota
<b>M.D.</b> .....Doctor of Medicine	<b>Neb.</b> .....Nebraska
<b>MD.</b> .....Middle Dutch	<b>neg.</b> .....negative
<b>Md.</b> .....Maryland	<b>Neh.</b> .....Nehemiah
<b>ME.</b> .....Middle English, or Old English	<b>N. Eng.</b> ....New England
<b>Me.</b> .....Maine	<b>neut or n.</b> ...neuter
<b>mech.</b> .....mechanics, mechan- cal	<b>Nev.</b> .....Nevada
<b>med.</b> .....medicine, medical	<b>N.Gr.</b> .....New Greek, Modern Greek
<b>mem.</b> .....member	<b>N. H.</b> .....New Hampshire
<b>mensur.</b> ...mensuration	<b>NHG.</b> .....New High German [German]
<b>Messrs. or</b>	<b>Ni</b> ... ..Nickel
<b>MM.</b> .....Gentlemen, Sirs	<b>N. J.</b> .....New Jersey
<b>metal.</b> .....metallurgy	<b>NL</b> .....New Latin, Modern Latin
<b>metaph.</b> ...metaphysics, meta- physical	<b>N. Mex.</b> ....New Mexico
<b>meteor.</b> ...meteorology	<b>N. T., or</b>
<b>Meth.</b> .....Methodist	<b>N. Test.</b> ...New Testament
<b>Mex.</b> .....Mexican	<b>N. Y.</b> .....New York [State]
<b>Mg.</b> .....Magnesium	<b>nom.</b> .....nominative
<b>M.Gr.</b> .....Middle Greek	<b>Norm. F.</b> ...Norman French
<b>MHG.</b> .....Middle High Ger- man	<b>North. E.</b> ...Northern English
<b>Mic.</b> .....Micah	<b>Norw.</b> ... ..Norwegian, Norse
<b>Mich.</b> .....Michigan	<b>Nov.</b> .....November
<b>mid.</b> .....middle [voice]	<b>Num.</b> .....Numbers
<b>Milan.</b> ....Milanese	<b>numis.</b> ...numismatics
<b>mid. L. or</b> { Middle Latin, Me- ML..... { diæval Latin	<b>O.</b> .....Ohio
<b>milit. or</b>	<b>O.</b> .....Old
<b>mil.</b> ... ..military [affairs]	<b>O.</b> .....Oxygen
<b>min.</b> .....minute, minutes	<b>Obad.</b> ....Obadiah
<b>mineral.</b> ...mineralogy	<b>obj.</b> .....objective
<b>Minn.</b> .....Minnesota	<b>obs. or †.</b> ...obsolete
<b>Min. Plen.</b> Minister Plenipoten- tiary	<b>obsoles.</b> ...obsolescent
<b>Miss.</b> .....Mississippi	<b>O.Bulg.</b> ....Old Bulgarian or Old Slavic
<b>ML. or</b> { Middle Latin, Me- mid. L... { diæval Latin	<b>Oct.</b> .....October
<b>MLG.</b> .....Middle Low German.	<b>Odontog.</b> ...odontography
<b>Mlle.</b> .....Mademoiselle	<b>OE.</b> .....Old English
<b>Mme.</b> .....Madam	<b>OF or</b>
<b>Mn.</b> .....Manganese	<b>O. Fr.</b> ....Old French
<b>Mo.</b> .....Missouri	<b>OHG.</b> .....Old High German
<b>Mo.</b> .....Molybdenum	<b>Ont.</b> .....Ontario
<b>mod.</b> .....modern	<b>opt.</b> ... ..optics, optical
<b>Mont.</b> .....Montana	<b>Or.</b> .....Oregon
<b>Mr.</b> .....Master [Mister]	<b>ord.</b> .....order
<b>Mrs.</b> .....Mistress [Missis]	<b>ord.</b> ... ..ordnance
<b>MS.; MSS.</b> manuscript; manu- scripts	<b>org.</b> .....organic
<b>Mt.</b> .....Mount, mountain	<b>orig.</b> .....original, -ly
<b>mus.</b> .....music	<b>ornith.</b> ...ornithology
<b>MUS.DOC.</b> ...Doctor of Music	<b>Os.</b> .....Osmium
<b>myth.</b> .....mythology, mytho- logical	<b>OS.</b> ... ..Old Saxon
<b>N.</b> .....Nitrogen	<b>O. T., or</b>
<b>N. or n.</b> ....North, -ern, -ward	<b>O. Test.</b> ...Old Testament
<b>n</b> .....noun	<b>Oxf.</b> .....Oxford
<b>n or neut.</b> ...neuter	<b>oz.</b> .....ounce, ounces
<b>Na</b> .....Sodium [Natrium]	<b>P.</b> .....Phosphorus
<b>Nah.</b> .....Nahum	<b>p.; pp.</b> ...page; pages
	<b>p., or part.</b> participle
	<b>Pa. or Penn.</b> Pennsylvania
	<b>paint</b> .....painting
	<b>palæon.</b> ...palæontology
	<b>parl.</b> .....parliament
	<b>pass.</b> .....passive



# ABBREVIATIONS.

pathol or	pt.....past tense
path.....pathology	pt.....pint
Pb.....Lead [ <i>Plumbum</i> ]	Pt.....Platinum
Pd.....Palladium	pub.....published, publisher, publication
Penn or Pa. Pennsylvania	pwt.....pennyweight
perf.....perfect	Q.....Quebec
perh.....perhaps	qt.....quart
Pers.....Persian, Persic	qtr.....quarter [weight]
pers.....person	qu.....query
persp.....perspective	q.v.....which see [ <i>quod</i> <i>vide</i> ]
pert.....pertaining [to]	R.....Rhodium
Pet.....Peter	R.....River
Pg. or Port. Portuguese	Rb.....Rubidium
phar.....pharmacy	R. Cath....Roman Catholic
PH.D.....Doctor of Philoso- phy	rec. sec....recording secretary
Phen.....Phenician	Ref.....Reformed
Phil.....Philippians	refl.....reflex
Philem.....Philemon	reg.....regular, -ly
philol.....philology, philologi- cal	regt.....regiment
philos. { philosophy, philo- or phil... } sophical	rel. pro. or rel.....relative pronoun
phonog....phonography	repr.....representing
photog....photography	repub.....republican
phren.....phrenology	Rev....Revelation
phys.....physics, physical	Rev.....The Reverend
physiol....physiology, physi- ological	Rev. V....Revised Version
Pied.....Piedmontese	rhet.....rhetoric, -al
Pl.....Plate	R. I.....Rhode Island
pl. or plu...plural	R. N.....Royal Navy
Pl. D.....Platt Deutsch	Rom.....Roman, Romans
plupf.....pluperfect	Rom.....Romanic or Ro- mance
P.M.....afternoon [ <i>post meri- diem</i> ]	Rom. Cath. { Roman Catholic Ch. or R. } Church C. Ch.... }
pneum.....pneumatics	r.r.....railroad
P. O.....Post-office	Rt. Rev...Right Reverend
poet.....poetical	Ru.....Ruthenium
Pol.....Polish	Russ.....Russian
pol. econ...political economy	r.w.....railway
polit.....politics, political	S.....Saxon
pop....population	S.....Sulphur
Port. or Pg. Portuguese	s.....second, seconds
poss.....possessive	s. [l. s. d.]...shilling, shillings
pp.....pages	S. or s.....South, -ern, -ward
pp.....past participle, per- fect participle	S. A. or S. Amer..South America, -n
p. pr.....present participle	Sam.....Samaritan
Pr. or Prov. Provencal	Sam.....Samuel
pref.....prefix	Sans, or Skr.....Sanskrit
prep....preposition	Sb.....Antimony [ <i>Stibium</i> ]
Pres.....President	s.c.....understand, supply, namely [ <i>scilicet</i> ]
pres...present	S. C. or S. Car....South Carolina
Presb.....Presbyterian	Scand.....Scandinavian
pret.....preterit	Scot.....Scotland, Scotch
prim.....primitive	scr.....scruple, scruples
priv.....privative	Scrip.....Scripture [s], Scrip- tural
prob.....probably, probable	sculp.....sculpture
Prof.....Professor	S. D.....South Dakota
pron.....pronoun	Se.....Selenium
pron.....pronunciation, pro- nounced	sec....secretary
prop.....properly	sec.....section
pros.....prosody	Sem.....Semitic
Prot.....Protestant	Sep.....September
Prov. or Pr. Provencal	Serv.....Servian
Prov.....Proverbs	Shaks.....Shakespeare
prov.....province, provincial	Si.....Silicon
Prov. Eng..Provincial English	
Prus.....Prussia, -n	
Ps.....Psalm, Psalms	
psychol....psychology	

# ABBREVIATIONS.

Sic.....	Sicilian	trigen.....	trigonometry
sing.....	singular	Turk.....	Turkish
sis.....	sister	typog.....	typography, <b>typo-</b> graphical
Skr. or		U.....	Uranium
Sans.....	Sanskrit	ult.....	ultimate, -ly
Slav.....	Slavonic, Slavic	Unit.....	Unitarian
Sn....	Tin [ <i>Stannum</i> ]	Univ.....	Universalist
Soc.....	Society	Univ.....	University
Song Sol...	Song of Solomon	U. Presb...	United Presbyterian
Sp.....	Spanish	U. S....	United States
sp. gr.....	specific gravity	U. S. A....	United States Army
sq.....	square	U. S. N....	United States Navy
Sr.....	Senior	Ut.....	Utah
Sr.....	Strontium	V.....	Vanadium
St.: Ste....	Saint	v.....	verb
St. ....	street	Va.....	Virginia
stat.....	statute	var.....	variant [word]
S.T.D.....	Doctor of Sacred Theology	var.....	variety of [species]
subj.....	subjunctive	Ven.....	Venerable
suf.....	suffix	Venet.....	Venetian
Su. Goth...	Suo-Gothic	vet.....	veterinary
superl.....	superlative	v. i. or	
Supp.....	Supplement	" v. intr...	verb intransitive
Supt.....	Superintendent	vil.....	village
surg.....	surgery, surgical	viz.....	namely, to-wit [ <i>vide-</i> <i>licet</i> ]
Surv.....	surveying	v. n.....	verb neuter
Sw.....	Swedish	voc.....	vocative
Swab.....	Swabian	vol.....	volume
sym.....	symbol	vols.....	volunteers
syn.....	synonym, -y	Vt.....	Vermont
Syr.....	Syriac, Syrian	v. tr.....	verb transitive
t.....	town	W.....	Tungsten [ <i>Wolfram</i> ]
Ta....	Tantalum	W.....	Welsh
Tart.....	Tartar	W. or w....	West, -ern, -ward
Te.....	Tellurium	Wal.....	Walachian
technol ...	technology	Wall.....	Walloon
teleg.....	telegraphy	Wash.....	Washington
Tenn.....	Tennessee	Westph....	Westphalia, -n
term.....	termination	W. Ind. }	West Indies, West
terr.....	territory	or W. I... }	Indian
Teut.....	Teutonic	Wis.....	Wisconsin
Tex.....	Texas	wt.....	weight
Th.....	Thorium	W. Va.....	West Virginia
theat.....	theatrical	Wyo.....	Wyoming
theol.....	theology, theological	Y.....	Yttrium
therap.....	therapeutics	yd.....	yard
Thess.....	Thessalonians	yr.....	year
Ti.....	Titanium	Zech.....	Zechariah
Tim.....	Timothy	Zeph.....	Zephaniah
Tit.....	Titus	Zn.....	Zinc
Tl.....	Thallium	zool.....	zoology, zoological
toxicol ...	toxicology	Zr.....	Zirconium
tp.....	township		
tr. or trans.	transitive		
transl.....	translation, trans- lated		

See also ABBREVIATIONS: in Vol. 1.

# IMPERIAL ENCYCLOPEDIA AND DICTIONARY.

---

WIGTOWN, *wig'ton*: royal and municipal burgh and seaport in s.w. Scotland; cap. of the county of W. or West Galloway; on W. Bay, near the mouth of the Bladenoch Water; 40 m. w.s.w. of Dumfries, and nearly 150 m. by railway from Edinburgh. The parish church, of Gothic architecture, was erected 1852. In the churchyard are three tombstones in memory of martyrs who suffered in the Episcopal persecution; and, on the summit of the Windyhill, the highest ground in the vicinity, there is also an obelisk of freestone in memory of these martyrs, two of whom, women, are reported to have been drowned here. A large and very handsome town-hall and court-house was erected 1863. There entered the port (1880) 639 vessels of 39,658 tons, cleared 654 of 39,049 tons.—Pop. (1881) 1,789; (1891) 1,509.

WIG'TOWN, or WIG'TON: county forming the s.w. corner of Scotland; bounded w. by the Irish Channel, n. by Ayrshire, e. by the Stewartry of Kirkcudbright and the Solway Firth, s. by the Irish Sea; extent e. to w. about 33 m., n. to s. about 26 m., 485½ sq. m.—about 46 per cent. arable. This county, which constitutes W. Galloway, was formed about 1341; 54° 38'—55° 4' n. lat., and 4° 16'—5° 6' w. long. W. is somewhat irregular in form, being deeply intersected by two arms of the sea, one of which, Loch Ryan, a long narrow inlet, stretches s. from the n.w. corner for 9 m. into the county, while Luce Bay on the s. makes a wide indentation 18 m. long, with an average width of 12 m., the heads of the inlet and bay being only 6 m. apart. The w. part of W., known as the *Rhins of Galloway*, thus forms a peninsula whose length (n. to s.) is 28 m., and breadth 1½—6 m.; its n. extremity is Corsewall Point, and its s. the Mull of Galloway, each promontory being provided with a light-house. The s.e. half of W. is separated from the Stewartry of Kirkcudbright by W. Bay, 15 m. long and 14 wide at its mouth, and between this bay and Luce Bay, W. extends s. in a blunt triangular form, terminating in Burrow Head. The inhabitants of W. were originally of Celtic origin, and till the middle of the 16th c., a Celtic dialect was universal; and a century afterward it was in use in the remote districts. W. is irregular in surface, but with no eminences



## WIGWAM—WILBERFORCE.

exceeding 500 ft. The soil is varied, and—except a portion along the sea-shore, especially in the s.e., which consists of a rich loam—the quality is inferior. The climate is mild, but moist, the rainfall being comparatively great. There are many dairy establishments engaged, almost exclusively, in making cheese similar to the Somersetshire cheddar. The Galloway pony, formerly much in vogue, is now scarce.

W. contains three rivers of considerable size; the Cree, the Bladnoch, and the Luce—the Cree and Bladnoch navigable for a few m. Small fresh-water lochs are numerous. In the Rhins of Galloway, on the s.w., is the parish of Kirkmaiden, the most s. point in Scotland—hence the phrase ‘from Maidenkirke to John o’ Groat’s’ (see JOHN O’ GROAT’S HOUSE). There were at an early period many religious houses in the county; and the church, believed to be the oldest in Scotland, founded by St. Ninian, was built near the site of the present village of Whithorn. At the Reformation there were 21 parishes; the number was reduced to 17. The principal towns are Wigtown, Newton-Stewart, Stranraer, and Whithorn. There is no mineral wealth, and little trade or manufacture. The mail-coach, run through W. first in 1804, was superseded by a railway, 1857. Pop. (1881) 38,611; (1901) 32,685.

WIGWAM, n. *wig’wōm* [Amer.-Indian, *wekou-om-ut*, in his or their house—from *wek*, his house]: the tent or lodge of a N. Amer. Indian, generally conical in shape.

WILBERFORCE, *wil’bēr-fōrss*, SAMUEL, D.D.: bishop of the English Church: 1805, Sep. 7—1873, July 19; b. Clapham, England; third son of the philanthropist William W. He was educated at Oxford, attaining high rank in classics and mathematics. Ordained 1828, he was successively curate of Checkendon and of Brightstone (Isle of Wight), rector of Alverstoke, and archdeacon of Surrey with canonship of Winchester Cathedral. Honors came rapidly: he was made chaplain to the prince consort 1843; sub-almoner to the queen 1844; dean of Westminster 1845; and bp. of Oxford the same year, which office he held until 1869, when he was translated to the see of Winchester. As early as 1841 he was Bampton lecturer. As bishop he was zealously active in diocesan duty, in ecclesiastical assemblies, and in the house of lords, where he made able speeches on the admission of Jews to parliament, the ‘Deceased Wife’s Sister’s Bill,’ the revival of the powers of convocation, and in favor of the repeal of the Corn Laws. In his diocese he labored to promote benevolent objects, the improvement of schools; and, before that, as rector for establishment of a training college for young clergymen. He was an eloquent preacher rather than a learned divine, and for some years was regarded as the leader of the high-church party. His publications in book-form were few: a *Hist. of the Episc. Church in America*; and some popular religious allegories, such as *Agathos* and *The Rocky Island*. With his brother Robert, he published the *Life and Correspondence* of his father. He was killed by falling from his horse while riding with Earl Granville near Dorking.

WILBERFORCE, WILLIAM: English philanthropist, prominent in the movement for abolition of the slave-trade: 1759, Aug. 24—1833, July 29; b. Hull; son of a wealthy merchant, descended from an old family, proprietors of Wilberfoss, in the E. Riding of York. W., at the age of nine, on his father's death, was sent to school at Wimbledon, where, under the care of a pious aunt, he ran the risk of becoming a Methodist; but his mother removed him to a Yorkshire school, where his religious impressions were dissipated by a life of gayety. His constitution was delicate, but he was quick and spirited, and fond of society, in which his lively conversation and musical talent made him a great favorite. While at school, he addressed a letter to a York paper 'in condemnation of the odious traffic in human flesh,' a subject which he seems never afterward to have lost sight of. At 17 he entered St. John's College, Cambridge, and, though not a very diligent student, he passed his examinations with credit. On attaining his majority he came into possession of a large fortune, and determined to enter parliament. In 1780 he was returned for Hull. He had known Pitt at Cambridge, and in London they became inseparable friends; W., in parliament, however, remained independent of party. The elevation of Pitt to the premiership gave him opportunity of taking office, but he declined; though he rendered efficient service to his friend. In 1784, Mar., on the eve of a dissolution, he spoke at a county meeting in York, called to vote an address against the Coalition Ministry; and such was the effect of his eloquence, that a resolution was passed by the freeholders asking him to stand for the county. He did so; and in spite of opposition from the great whig families, he was returned without a contest. W.'s success in the leading county set an example to other constituencies, which was of great advantage to the Pitt ministry. In the autumn, W. made a tour on the continent with Dr. Isaac Milner, dean of Carlisle, during which the serious impressions of his youth seem to have been revived; he returned a convert to evangelical Christianity. In 1787 he turned from social gayety, devoting himself to founding an association for reformation of morals; and in the following year, while in poor health, he entered on his great struggle for abolition of the slave-trade, for which he thenceforward dedicated his whole time. W. had then recently made the acquaintance of Thomas Clarkson (q.v.), by whom he was powerfully supported as well as influenced; he found the Quakers also waiting to help. In 1789 he first proposed the abolition of the slave-trade in the house of commons, and met, as he expected, with powerful opposition. In 1804 his bill was first carried through the commons; it was thrown out in the lords; and in the following year it was lost in the commons. But while W. was leading the movement in parliament, Clarkson was conducting the agitation throughout the country; and 1806 a resolution was moved by Fox, pledging the commons to a total abolition of the slave-trade in the following session. It was adopted by the lords. In



## WILBUR-WILCOX.

1804, Jan., just before the discussion began, a work had been published by W. against the slave-trade, which had a marked influence on public opinion and the subsequent debates. The bill was passed by the lords, and in the commons it was carried by an enthusiastic majority. Sir Samuel Romilly, who supported the measure, compared the feelings of Napoleon, then at the height of his glory, with those of the English philanthropist, 'who would that day lay his head upon his pillow, and remember that the slave-trade was no more;' and the whole house burst into applause, and greeted W. with enthusiastic cheers. W. now sought to secure the abolition of the slave trade abroad, and entered on an agitation for the total abolition of slavery itself. Declining health, however, compelled him 1825 to retire from parliament, in which, since 1812, he had sat for the borough of Bramber. The legislative movement against slavery was then intrusted to Sir T. Fowell Buxton (q.v.); and three days before W.'s death news was brought him that the Abolition bill had passed a second reading, and he thanked God that he had lived to see his countrymen spend 20 millions sterling in such a cause. He was buried as a national benefactor in Westminster Abbey. W. is the author of a *Practical View of Christianity* (1797), a serious plea for a more earnest type of Christian life and action among the higher and middle classes. In 1801 he established in London the *Christian Observer*.—See *Life of Wilberforce*, by his sons.

WILBUR, *wil'bér*, HERVEY BACKUS, M.D.: philanthropist: 1820, Aug. 18—1883, May 1; b. Wendell, Mass.; son of the Rev. Hervey W., biblical scholar and author. He graduated at Amherst Coll. 1838, studied medicine, and practiced in Lowell and Barre, Mass. In the latter place he experimented in the education of idiots, and organized there 1848, July, the first school, still continued, for this class of unfortunates in the United States. His improvements on foreign methods were widely adopted. From 1854 until his death he was supt. of the N. Y. state asylum for idiots at Syracuse.—His brother, CHARLES TOPPAN W., M.D., b. Newburyport, Mass., 1835, May 18, was connected with the last-mentioned asylum, and assisted in founding the state asylum at Columbus, O. After serving as surgeon in the civil war, he was prominent in founding educational idiot asylums in Ill., Mich., Ind., Io., Kan., Neb., Minn., and other states; and established 1882 the only periodical devoted to the object, the *Philanthropical Index and Review*.

WILBURITES, n. plu. *wil'bér-īts*: in *chh. hist.*, a section of American Friends (or Quakers), named from their leader, John Wilbur, who separated from the main body in the first half of the 19th c. on the ground that the Friends were not adhering strictly to their original principles.

WILCOX, ELLA (WHEELER): poet: 1845— ———; b. Johnstown Centre, Wis.; received education in Windsor public schools and at the Univ. of Wisconsin; since 1887 has resided in New York. Among her publications are: *Drops of Water* (1872); *Poems of Passion* (1883-94), *Poems*

## WILD—WILDBAD GASTEIN.

*of Pleasure* (1888); and novels: *Was it Suicide?* (1893); *A Double Life* (1894).

**WILD**, a. *wīld* [Icel. *villr*, wandering at large: Dan. *wild*, wild: Dut. *wild*, proud, savage: Scot. *will*, confused, bewildered: W. *gwill*, one that wanders about]: in a state of nature; not tamed or domesticated; growing without culture; savage; uncivilized; desert; uninhabited; tempestuous; profligate; reckless; ungoverned; impatient of restraint or control; boisterous; full of life and spirits; frolicsome; irregular; highly excited, as with passion; having a fierce untamed look; performed without plan or order; not well arranged; imaginary: N. an uncultivated tract of land; a desert; in *OE.*, a weald. **WILD'ISH**, a. *-ish*, somewhat wild. **WILD'LY**, ad. *-lī*, in a wild manner. **WILD'NESS**, n. *-nēs*, rough uncultivated state; state of being untamed; rudeness; irregularity of manners; absence of prudence; indulgence in profligacy; in *OE.*, alienation of mind. **WILD BOAR**, a wild animal of the hog kind, from which the swine of the farm-yard are descended. **WILD CAT**, n. ferocious animal of the cat kind (see **LYNX** [**BAY LYNX**]): **ADJ.** reckless; wild; unsound or unstable, as *wild cat* schemes, *wild-cat* banking. **WILD'FIRE**, inflammable materials difficult to quench after being fired; a disease in sheep in which there is inflammation of the skin: a sort of lightning unaccompanied by thunder. **WILD-GOOSE CHASE**, the pursuit of something as likely to be caught as the wild goose. **WILD HONEY**, honey found in the forest in hollow trees or rocks. **WILD OATS**, an oat-like kind of wild grass. **TO SOW ONE'S WILD OATS**, to pass in early manhood through a period of wild and reckless dissipation. **WILD'ING**, n. a wild crab-apple; a tree that grows without cultivation: **ADJ.** wild; uncultivated. **WILDERNESS**, n. *wīl'-dēr-nēs* [*AS. wilder*, a wild animal]: an uncultivated or desert region; a desert; in *OE.*, the state of being wild confusion.—**SYN.** of 'wild, a.': turbulent; licentious; uncultivated; untamed; inconstant; mutable; fickle; inordinate; loose; uncouth; strange.

**WILDBAD**, *vīlt'bāt*: town of Württemberg, Germany; 28 m. w. of Stuttgart, 14 m. e. of Baden-Baden, 32 m. s.s.e. of Carlsruhe, 18 m. of which are by railway to Pforzheim, and the remaining 14 by road through a beautiful portion of the Black Forest (q.v.). It is noted for its thermal springs and baths, ranging from 90° to 100° F. The baths consist of numerous basins formed round the springs as they gush from the rocks, and floored with sand for the comfort of the bathers. From the fact that these baths are natural or *wild*, not artificial, the town derives its name. The waters are nearly pure, the principal ingredient being common salt. They are peculiarly beneficial for rheumatism, gout, stiffness of limbs, paralysis, etc., and for some skin diseases. The season is from May till Sep., and the annual number of visitors has steadily increased from 470 in 1830 to about 6,000. Geitre abounds here and in the neighboring close valleys of the Black Forest.—Pop. (1885) 3,514.

**WILD'BAD GAS'TEIN**: see **GASTEIN**.



## WILD CHERRY—WILDER.

**WILD CHERRY:** name given to two trees, also to a shrub, of the order *Rosaceæ*, genus *Prunus*: see **CHERRY**: **BIRD-CHERRY**: **CHOKE-CHERRY**.

**WILDE**, *wîld*, **OSCAR**: æsthete and man of letters: b. Dublin, Ireland, 1856; son of Sir William Wills W., distinguished oculist and antiquarian, and of Lady Jane Francesca W., who wrote popular poetry under the pen-name *Speranza*. Oscar was educated at the school in Enniskillen and at the Universities of Dublin and Oxford, taking many honors for scholarship. Going to London 1879, and attracting attention by eccentricities of dress and manner, he originated an æsthetic fashion, and taught that artistic dress and surroundings should be promoted, and that beauty is to be sought in all things. On a visit to America 1881 he gave 200 lectures. He published a book of poems 1880; drama of *Vera* (1882); *The Happy Prince* (1888); *Donan Gray*, and *Lord Arthur Savile's Crime*, both stories (the latter 1891); and a society play, *Lady Windermere's Fan* (1892). He edited the *Woman's World*, London. He was convicted, 1895, in London of an infamous crime, and was sentenced to two years' imprisonment with hard labor—one result of the theory of art for art's sake.

**WILDE'BEEST**: name for the Gnu (q.v.).

**WILDER**, *wîld'ér*, **BURT GREEN**, M.D.: comparative anatomist: b. Boston, Mass., 1841, Aug. 11. He graduated from the Lawrence Scientific School 1862; in 1862-65 was in surgical service in the army; graduated M.D. from the medical dept. of Harvard 1866; and since 1867 has been prof. of physiol., zool., and compar. anat. in Cornell Univ. Some of his first investigations were on abnormities such as supernumerary digits. For the past 12 years he has made the brain of vertebrates his specialty, has published numerous papers in Amer. and foreign serials, and has been pres. of the Amer. Neurological Soc. He has given courses of lectures in a number of leading institutions east and west. His popular volumes are: *What Young People Should Know* (1875), and *Emergencies: how to Avoid and how to Meet Them* (1879). For students, he has published *Health Notes for Students* (1883), and, as co-author, *Anatomy of the Domestic Cat* (1882).

**WILD'ER**, **MARSHALL PINCKNEY**: experimental horticulturist: 1798, Sep. 22—1886, Dec. 16; b. Rindge, N. H. A fortune gained in wholesale trade in Boston enabled him to devote time and money to fruit-culture at his place in Dorchester, on which subject he published valuable papers in horticultural and other journals and reports. He was pres. of societies, both state and national, pertaining to this interest and to agriculture; also pres. of the New England Historico-genealogical Soc. and of the Mass. senate (1850), besides holding other important offices. He was a man of noble presence and wide popularity. Among his many publications were: *California* (1871); *The Hybridization of Plants* (1872); *The Progress and Influence of Rural Art* (1872).

## WILDERNESS.

**WILDERNESS, BATTLES OF THE:** series of engagements, 1864, May, between the Union troops and the Army of the Potomac under Gen. Grant and the Confederate troops in the Army of N. Virginia under Gen. Lee, in the wild tract of country in Orange and Spottsylvania cos., Va., bordering on the Rapidan river. The designation is usually applied to engagements extending May 5—June 1, and including the battles of Spottsylvania (May 8–21) and those of North Anna (May 23–26), and by some milit. writers the second battle of Cold Harbor also (June 3); but the designation belongs properly to the fierce battles of May 5 and 6.—Early in 1864 the Confederates, who were familiar with the topography of the ‘wilderness,’ occupied a position on the s. side of the Rapidan, between Mile Run and Gordonsville, where Gen. Lee could both cover Richmond and threaten Washington. The Army of N. Virginia numbered about 60,000 effectives. Gen. Meade was in immediate command of the Army of the Potomac, which had about 130,000 men, of whom more than 100,000 were effectives. Gen. Grant made his headquarters with Gen. Meade in Mar., and planned a campaign having for its ultimate object the intervention of the Union army between the Confederates and Richmond. He designed passing through the ‘wilderness,’ but Gen. Lee, suspecting his intentions, prepared to give battle in that wild tract. In accordance with Grant’s plans, Meade began moving his army toward the Rapidan, to cross it, May 4. Warren’s (5th) and Sedgwick’s (6th) corps crossed at Germanna ford, under cover of Wilson’s div. of Sheridan’s cav.; Hancock’s (2d) corps crossed at Ely’s ford, 6 m. below, under cover of the remainder of Sheridan’s cav.; and Burnside’s (9th) corps was left on the Orange and Alexandria railroad to check any sudden movement of the Confederates toward Washington. Lee was so thoroughly aware of Grant’s movements that he advanced his own army to force a fight in the ‘wilderness,’ and for a time both armies were moving simultaneously toward each other. May 4 Grant ordered an advance on Lee for the following morning; and at an early hour the 5th corps and the Confederate advance met, and had a severe fight, in which each force was in turn defeated, the Union force faring worst on account of the steady reinforcement of the Confederates during the encounter. Grant hurried supports (Sedgwick and Hancock) to Warren; the fighting was kept up till 4 P.M., without practical results to either side; both sides ceased firing temporarily and threw up defensive works only about 200 yards apart; and on the arrival of Hancock the fighting was renewed by the Union force and kept up till dark. During the night Grant brought up Burnside’s corps, and Lee, Longstreet’s corps and a div. of Hill’s corps. Fighting was renewed at daybreak and was maintained till dark almost without interruption. Lee took advantage of a fire that had broken out in the woods and had forced the Union troops to abandon their breast-works, to make a decisive assault. The Confederates charged and penetrated the Union lines, but were repulsed with heavy loss. Al-



most all the fighting of the two days was done with muskets, as the ground would not permitartil. movements. Though the results of the battles were in no wise decisive, the advantage manifestly was with Grant, as Lee had failed to check his movement toward Richmond, and had been repulsed in all his direct attacks. Both armies were too much exhausted for fighting on the third day. After dark, Grant began moving toward Spottsylvania Court-house, 15 m. s. e.; but Lee, again anticipating him, moved for the same point, and by a superior knowledge of the country reached it first, and by the evening of the 8th had his whole force behind breast-works.

Though the narrative has thus covered the actual battles of the 'wilderness,' it is continued that the movement, of which the battles of May 5 and 6 were unexpected incidents, may be understood. The Union advance was by cav. and the 5th corps (Warren's). It reached Spottsylvania Court-house early on the 8th, after several slight engagements on the way. The cav. was unable to hold its ground, till Warren came up, when the Confederates were forced back to the line of Longstreet's corps, where severe fighting occurred. Through the day the 5th corps was almost constantly in action, being joined in an unsuccessful attack at dark by the 6th corps. The following day (May 9) was spent by Grant in disposing his force for attack, and by Lee in strengthening his position. There was almost constant fighting through the day, and among the severe losses was Gen. John Sedgwick (q.v.), killed by a sharp-shooter. Hancock attacked the Confederate left on the 10th, crossing the Po river to do so, and met with success till ordered back for an intended assault on the centre. His severest losses were while withdrawing from his advanced position; but he resisted a direct attack, and made a second successful one. Later in the day the 2d and 5th corps, with two of Hancock's divisions, made three unsuccessful assaults on the Confederate left centre, considered the strongest point of their position; and a part of the 6th corps carried the outer line of the enemy's intrenchments. May 12 Hancock carried the salient on the Confederate right centre, captured 4,000 men and 20 cannon, and resisted five attempts to dislodge him; but neither side gained any material advantage. At the same time Burnside was repulsed in an attack on the left, and Warren in another on the right. Several days were spent in maneuvers, and Grant, finding Lee's right unassailable, began moving his corps from the right to the left, intending to thus pass around Lee's right toward North Anna river. Lee adopted the same course, made several ineffectual attacks on Grant's right, and had his army in position on the s. bank of the river when the Union army reached the n. bank (May 23). Hancock on the left, and Warren on the right, 4 m. apart, crossed the river and assaulted, while Burnside was repulsed in attempting to cross to take a position between Hancock and Warren. Warren was assaulted, but held his ground, and was reinforced by the 6th corps.

## WILDEY.

Unable to dislodge the enemy, Grant withdrew to the n. bank at night (26th), and resumed his tactics to turn the enemy's position by his right, marching to the Pamunkey river, and crossing it. Lee also pursued his former course, and, following a shorter line, reached Cold Harbor, on the Chickahominy, and was intrenched there before Grant arrived.—For subsequent operations of the two armies, see CHICKAHOMINY, BATTLES OF THE: COLD HARBOR (SECOND), BATTLE OF.—In the above operations, the losses of the Union army, according to Gen. Meade's report, were 5,584 killed, 28,364 wounded, and 7,450 missing—total 41,398. This does not include Burnside's losses prior to his union with Meade (May 24). The Confederate losses were not officially reported, but are believed to have been less than half those of the Union army.

WILDEY, *wil'dĭ*, THOMAS: 1783, Jan. 15—1861, Oct. 19; b. London. He came to America 1817, and 1819, Apr. 26, established Washington Lodge, No. 1, in Baltimore, the first lodge of Odd Fellows in this country. He was 'grand sire' of the grand lodge 1825-33; and 1826 visited England and obtained from the Manchester Unity an independent charter for the grand lodge of the United States. Members of the order have erected a monument to him in Baltimore.

## WILD-FOWL.

**WILD'-FOWL:** popular term, synonymous with *Water-fowl*, generally applied to web-footed birds; sometimes including herons, plovers, and other birds which frequent rivers, lakes, and sea-shores (see the several titles).—*Wild-fowling* is one of the most difficult, yet one of the most interesting pursuits of the sportsman. *Rock-fowling* (see **FOWLING**) is not included under this term. Wild-fowling is prosecuted in a great variety of ways. The ancient Greeks and Romans captured wild-fowl by various kinds of nets, one of which, called the *argumentum*, was like the modern decoy-pipe, the birds, however, being generally driven, and not enticed into it. The *Panthera* was a large purse or drag net, placed along the banks of rivers. The ancient wild-fowlers sometimes practiced a system of decoying. Nooses and bird-lime also were employed. The Egyptians made much use of the *throw-stick*, a missile similar to the boomerang of the Australians, and which was dexterously thrown to hit the neck of the bird. In later times, falconry was much practiced for capture of wild-fowl.—In modern use, though many wild-fowl are killed with the ordinary fowling-piece, the greatest numbers are obtained by the use of much larger guns in punts and yachts, by which many birds are killed at one shot. The *stalking-horse* is still used in some countries (e.g., England, to enable the wild-fowler, armed with an ordinary fowling-piece, to approach within reach of the birds. The horse trained for the purpose advances toward them, the fowler concealing himself on the side of the horse furthest from them. An ox is sometimes trained for this use. Artificial stalking-horses are sometimes employed in parts of France, made of canvas and stuffed with straw, the head down, as if grazing. Wild-fowl shooting is not unattended with danger. In pursuit of wounded birds on the ooze, the sportsman or fowler must use *splashers*, thin boards about 18 inches square, attached to the feet, to prevent him from sinking; and if he fall, it is very difficult for him to regain his feet. He cannot raise himself by resting his hands on the mud, which only makes him sink deeper and deeper, nor can he do it by getting up on his knees. The only method is to roll over on the back, drawing the arms out of the mud; and placing one foot with his splashers firmly on the ooze, to press both hands on the knee of the leg so raised, and give a vigorous spring. The punter is also in great danger of losing himself in foggy weather when pursuing wounded birds, and being unable to get back to his punt before he is caught by the return of the tide.

The curly-coated retriever is the best dog for the wild-fowl shooter, but good training is necessary to fit the dog for his use. The punter ought not to carry a dog with him, because the dog, having no opportunity of exercise after his return from the water, soon suffers from the cold of the winter weather in which the sport is pursued.

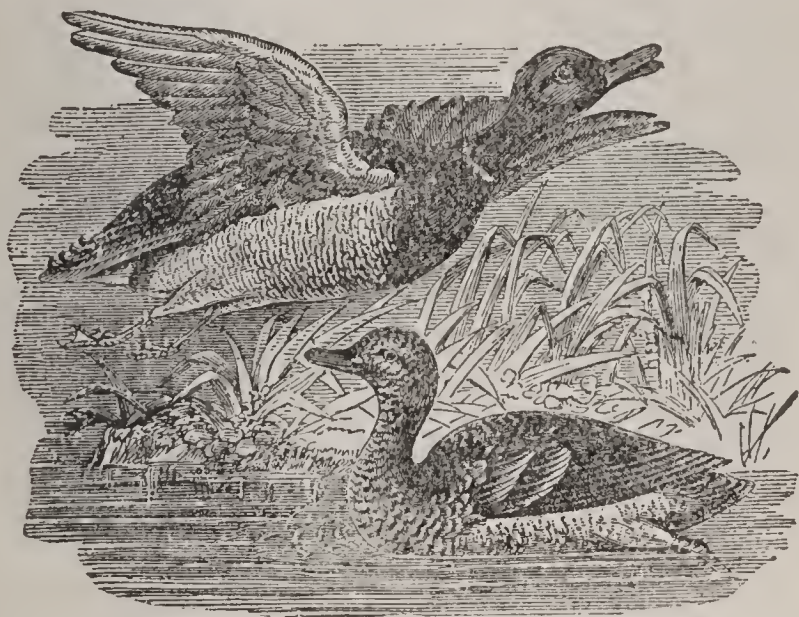
*Sledging for wild-fowl* is practiced by professional wild-fowl shooters on some coasts. The sledger traverses the oozes by means of a small light sledge called a *launching-*



## WILD-FOWL.

*punt*, with a gun in the forepart. He pushes it ahead, crawling on his knees, and often at full length on the mud, till he comes within range. His most severe work is on sands and dry ground.

The *gunning-punt* is a small generally flat-bottomed boat, about 17 ft. in length, with a gun placed in the front of it, generally carrying about half a pound of shot at a charge. The punt must be nicely trimmed, so that the gun is nearly on a level with the surface of the water; and the fowler, having approached the birds where they are congregated, often kills great numbers by its discharge. The sport is pursued both by day and by night. The punt is generally constructed to carry only one person; and though he rows it in the ordinary manner till he discovers the birds, he is obliged then to lie down in the punt, and force it forward by a pole or by the oars with no little exertion, till he comes within range. There is danger of his mistaking another punt in the darkness of night for an assemblage of wild-fowl, and firing at his fellow-sportsman. In a clear moonlight night, he proceeds, if possible, against the light, so that he may see, and not be seen. The



Wild-duck or Mallard, Male and Female.

*punt-gun* is capable of being *tipped*, i.e., elevated to shoot water-fowl on the wing; and the most successful shots are often made by waiting till they rise, and tipping the gun. The punter cannot expect to recover all his wounded birds.—The *sailing-punt* saves much hard work, but is less safe, and is utterly unsuitable for rough water. A *shooting-boat* is therefore sometimes used; but in it the gun cannot be fixed level with the surface of the water, as in the punt, and still more is this the case with the *shooting-yacht*: the practice of the sportsman is therefore different, and the best shots are made usually after the birds are on the wing. The helmsman of the shooting yacht must be quick and skilful in luffing up in such a manner as to cross the flight of the birds, that they may be well exposed to the gun, which is generally larger



## WILD FOWL.

than the punt-gun. In approaching the birds, great caution is necessary, and the men in the yacht must be concealed behind the bulwarks.

In severe winters the *decoy-pond* is most productive. It must be secluded; no use of gun or rifle should be permitted in its neighborhood. An area of 3 or 4 acres is about the best for a decoy-pond: very large ones are comparatively much less productive. It should be surrounded with trees and bushes; reeds and sedges being permitted to flourish near the water. Several *pipes* are led off from the pond in different directions; and in these pipes, which are ditches 6 or 8 in. deep, curved, and narrowing toward the extremity, the wild-fowl are caught, particularly mallards, teal, and widgeons—often in very great numbers. The length of the pipe is generally 60 to 80 yards, its breadth at the mouth 20 to 30 ft., diminishing to 2 ft. at the extremity, where it terminates in a tunnel-net, generally carried out on the dry land. The whole pipe is spanned with a light netting, spread upon semi-cir-



Wild-fowl Decoy-pipe.

cular bars of iron rod, in an arch about 12 ft. above the water at the entrance, but becoming lower as the pipe becomes more narrow. To attract wild-fowl to the pond, and to induce them to enter the pipe, *decoy-ducks* are kept, constant inhabitants of the pond, and regularly fed. Wild-fowl come more readily to the pond because of their presence, and follow them also into the mouth of the pipe, when they come at the well-known whistle of the decoy-man, to feed on the grain which he scatters for them on the water. It is only thus that the decoy-ducks are of use: they are not trained in any way, nor do they show any intelligence beyond response to the whistle which invites them to their food. Very different is the case with the decoyer's dog, the *piper*, so called not from any vocal powers, but from his use in enticing birds into the pipe. The dogs best adapted for this purpose are of a peculiar breed, small, fox-like, and very lively and frolicsome.

They are carefully trained, and their peculiar qualities seem in some measure hereditary. On the convex side of the curve of the pipe, for about 30 or 40 yards, instead of netting coming down to the ground, screens made of reeds are placed of height sufficient to conceal the decoyer: but they are placed obliquely, with narrow outlets between them, through which his dog may pass, and with bars in the intervals about 18 in. high, for the dog to leap over. When the wild-fowl have been attracted to the mouth of the decoy, and the decoyer, peeping through the screens, perceives that they are in a proper situation, he sends out the dog, which makes sportive gambols in their sight; and they are attracted by the strange object, as sheep are when a small dog plays about in the field where they graze. They enter the pipe in pursuit, as if for gratification of their curiosity, and the dog leaps over the first leaping-bar, and disappears behind the screens, where his master immediately rewards him with a morsel of some delicacy. When the wild-fowl have advanced a little further, the dog is sent out again, repeats his gambols, leaps over the second leaping-bar, and gets a second morsel. The curiosity of the birds seems to increase, and when they have proceeded far enough the man shows himself, whereupon a rush is made by the birds toward the far end, where they are captured. The dog is trained to keep perfect silence: a single bark would disperse the birds. The success of the decoyer depends much on the weather, and he must consider the direction of the wind in the choice of the pipe that he is to use. Wild-fowl are captured in the decoy in the daytime; they generally leave the decoy-pond at night for neighboring feeding-grounds.

*Flight-ponds*, usually 70 or 80 yards square, are used chiefly for capture of pochards or dun-birds, which very seldom enter the pipes of the decoyer: the same pond is sometimes used both as a decoy-pond and a flight-pond. The pochard, having its legs placed far back, cannot rise from the water so suddenly as the wild-duck or widgeon, and skims the surface for many yards, proceeding by a very gradual ascent. To capture flights of pochards, nets are used, which are fixed to a cumbrous apparatus of poles at the side of the pond: these nets are capable of being thrown up suddenly into the air, so as fully to confront the birds as they issue from the pond. The fowler's skill relates very much to the moment of raising his net, which he does by drawing a bolt or trigger. Pens are formed in front of the net, of reed-screens about 3 ft. high by 2 or 3 ft. square, and the birds falling into them on being thrown back from the net, are caught, not being able to rise again: the number caught at once is sometimes very great.—See Col. Hawker's well-known work on *Shooting*; and *The Wild-fowler*, by Folkard. In Folkard's work it is remarked that writers on sporting literature generally apply correct terms to game and birds of the land, while water-fowl are invariably classed by them as 'flocks.' The modern terms, as applied to water-fowl, are, according to Folkard, as follows: A herd of swans: a gaggle of geese (on the



## WILD HUNT.

water): a skein of geese (on wing): a paddling of ducks (on the water): a team of wild-ducks (flying): a sord or suit of mallards: a company of widgeon; a flight or rush of dun-birds: a spring of teal: a dopping of sheldrakes: a covert of coots: a herd of curlews: a sedge of herons: a wing or congregation of plovers: a desert of lapwings: a walk of snipes: a fling of oxbirds: a hill of ruffs. A small number of wild-fowl, e.g., ducks and geese (about 30 or 40), is termed a 'trip.' A like number of widgeon, dun-birds, or teal, is termed a 'bunch;' and a smaller number (10 to 20) is called a 'little knob.' Of swans, it would be said, a 'small herd;' and sometimes of geese, a 'little gaggle,' or a 'small skein;' and so of ducks, a 'short' or 'long team.'

WILD HUNT (Ger. *Wilde* or *Wüthende Jagd*; also *Wildes* or *Wüthendes Heer*, Wild or Maddening Host; *Nachtjäger*, Night Huntsman, etc.): in an ancient and still popular German superstition, a fancied noise sometimes heard in the air at night, as of a host of spirits rushing along over woods, fields, and villages, accompanied by shouting of huntsmen and baying of dogs. Among the German people the stories of the Wild Huntsman are numerous and widespread: though varying in detail, they are uniform in essential traits. The root of the whole notion is discernible in the expression used by the peasants of Lower Germany when they hear a howling in the air, 'Wode hunts' (*Wode jaget*), that is, Wodan or Odin marches, as of old, at the head of his battle-maidens, the Walkyries (q.v.), and of the heroes of Walhalla; for the old heathen gods were not fully dislodged from the imaginations of the people by Christianity, but were degraded into ghosts or demons. As the celestial god Wodan, lord of all atmospheric and weather phenomena, and consequently of storms, was conceived as mounted on horseback, clad in a wide dark cloak, and with a broad-brimmed hat; the Wild Huntsman also appears on horseback, in hat and cloak, and is accompanied by a train of spirits—the ghosts of drunkards, suicides, and other malefactors, often without heads, or otherwise shockingly mutilated. On very rare occasions, the Wild Huntsman shows kindness to the wanderer whom he meets; but generally he brings hurt or destruction, especially to any one rash enough to address him, or join in the hunting cry. Whoever remains standing in the middle of the highway, or steps aside into a tilled field, or throws himself in silence on the earth, escapes the danger. In many districts, heroes of the older or of the more modern legends take the place of Odin. The legend has also in recent times attached itself to individual sportsmen, who, as a punishment for their immoderate addiction to sport, or for their cruelty in it, or for hunting on Sunday, were believed to have been condemned henceforth to follow the chase by night. In Lower Germany there are many such stories of one Hakkelberend, whose tomb is shown in several places: still the very name leads back to the myth of Wodan, for Hakkelberend means literally the mantle-bearer. The appearing of the Wild Hunter is not

## WILD RICE—WILFRID.

confined to any particular season, but is most frequent in the 12 days between Christmas and Epiphany.

Another version of the Wild Hunt is found in the legend prevalent in Thuringia and the district of Mansfeld. There the procession, formed partly of children who had died unbaptized, and headed by Frau Holle or Holda (see BERCHTA), was believed to pass yearly through the country on Holy Thursday—an old man, with white hair, the faithful Eckhart (see TANHÄUSER and VENUSBERG) preceded the spirit-host, to warn the people to keep out of the way, that they might not come to hurt. This host of Holda or Berchta also prefers the season about Epiphany. In one form or other, the legend of the Wild Hunt is spread over all German countries, and is found also in France, and even in Spain. In Lower Germany it has been preserved in an older and purer form than in Upper Germany. It has probably some connection with Celtic mythology, but not apparently with the Slavonic.—See Grimm, *Deutsche Mythologie*.

WILD RICE: see RICE.

WILE, n. *wīl* [AS. *wīl*, a wile: Lith. *wylus*, deceit: the same word as *guile*]: a stratagem; a sly artifice; something intended to deceive or ensnare; deceit; fraud: V. in *OE.*, to deceive; to impose upon. WILY, a. *wīlĕ*, full of wiles or tricks; artful; sly; crafty; cunning; subtle. WĪ'LILY, ad. *-lī*. WĪ'LINESS, n. *-nēs*, cunning; guile.

WILFRID, *wīl'frīd*, SAINT: Anglo-Saxon bishop (abp. of York): about 634–709; b. in the kingdom of Bernicia, of noble parentage. He became at the age of 14 the attendant of a Saxon nobleman named Cudda, who had retired to spend the last years of his life in the monastery of Lindisfarne. There his attention was directed to the controversy as to the two times of celebrating Easter—the Roman and the Scoto-British (see EASTER). W. at the age of 19 visited Rome to ascertain which was in the right—bearing recommendations from the courts of Kent and Bernicia. He returned to England a warm partizan of the Roman party. From Alfrid, King of Northumbria, he received a grant of land and a monastery at Ripon, and there, 664, he was ordained a priest. The synod of Whitby, which met 664 to discuss the disputed questions between the two parties in the church, was attended by the most distinguished members of both; and among these were Colman, Bp. of Lindisfarne, and Wilfrid, representing opposite sides. We have a curious account of this conference. The king presided, and seems at first to have been puzzled by the arguments; but he noticed that Colman always referred to St. Columba, W. to St. Peter—and it struck him that the relative power of these saints had a close connection with the points at issue. 'St. Peter,' said W., 'is the rock on which the Lord founded his church, and to him he intrusted the keys of heaven.' 'Did St. Columba not receive the same power?' asked the king. Colman could not say he had. 'Then you both admit that God has given the keys to St. Peter?'



## WILFUL—WILHELMINA.

Both said they did. 'Well,' continued the king, 'if it is so, I shall not oppose him. Were I to do otherwise, I might find no one to open the gate when I came there; St. Peter might turn his back on me. We must not offend him.' The council and audience were carried away by this argument, and the king decided in favor of the Roman party. W. was afterward named bishop of York, but did not enter into possession of his see until 669. He then surrounded himself with great pomp, built churches, one of which, at Hexham, was said to be the finest n. of the Alps, and strove to oppose the ecclesiastical to the royal power. A quarrel with Egfrid, the new King of Northumbria, followed, and W. was deposed. He set out for Rome, to appeal to the pope, but was driven by a storm to the coast of Friesland, whose inhabitants were still pagan. There, however, he was hospitably received by the king; and such was the effect of his preaching among the Frisians, that he baptized many thousands of the people, and all the princes. The event is memorable in the history of n. Germany and Scandinavia, as the beginning of their conversion to Christianity by Anglo-Saxon missionaries, and the introduction of the arts and knowledge inherited from ancient civilization (see BONIFACE: WILLIBROD). W. reached Rome, and the pope decided in his favor; but on his return to England, the king gave no heed to the decree, and committed him to prison. He escaped, however, to the Weald of Sussex, where he converted the pagan inhabitants. He was afterward recalled to his see 668, and a proposal was made to elevate him to the primacy, but he was still opposed, as the leader of the Roman party, and was deposed 691-692, and excommunicated. He again went to Rome, remained there some years, returned to England in 705, and died at Dundle, in Northampton. He was buried at Ripon.

WIL'FUL, WIL'FULNESS: see under WILL 1.

WILHELMINA, *vîl-hêl-mê'na*, HÉLÈNE PAULINE MARIA: Queen of the Netherlands: 1880, Aug. 31—  
 ———; b. at the Hague. On the death of her father, King William III., 1890, Nov. 23, she succeeded to the throne. Her mother, Queen Emma, daughter of Prince George Victor of Waldeck-Pyrmont and sister of the **Duchess of Albany**, acted as regent during the illness of the king, and held that office until W. reached her majority and was crowned (1898). The young queen is well educated; in addition to her native tongue she has acquired, under the supervision of her cultured mother, a speaking as well as a historical and literary knowledge of French, German, and English. She is said to be a charming, unaffected young woman, with kindly spirit and vivacious manners. On 1901, Feb. 7, she was married to Prince Henry of Mecklenburg-Schwerin.

## WILHELMSHAVEN—WILK.

WILHELMSHAVEN, *vīl'hēlms-hā-vēn*, or WIL'HELMSHAFEN, *-fēn*: chief naval station and war-port of Germany, on the North Sea, on the e. side of the bay or basin of Jahde or Jade (q.v.); about 45 m. n.w. of Bremen. The Jahde is connected with the North Sea by a channel 3 m. long. The town, projected 1856, is regularly laid out on a strip of land bought by Prussia from Oldenburg 1864. It is now a fortress of the first rank, defended by outlying forts and an elaborate system of torpedoes; and with its moles, extensive basins, dry-docks, vast naval stores, and work-shops for all requirements of a fleet, has been a very costly creation—the massive buildings being erected on soft and swampy ground. Water has been obtained by means of artesian wells. A harbor for commercial purposes has been made s. of and connected with the naval port; but the mercantile importance of W. is yet in the future. Most of the inhabitants are connected with the dock-yard and fleet.—Pop. (1880) 13,131; (1885) 13,972.

WIL'HELMSHÖHE: see CASSEL.

WILK, n. *wīlk*: see WIELK 1.



## WILKES.

WILKES, *wilks*, CHARLES: naval officer and explorer: 1798, Apr. 3—1877, Feb. 8; b. New York. He entered the navy 1818, and became lieut. 1826. Assigned to the dept. of charts and instruments 1830, W. was the first in this country to make observations with fixed astronomical instruments, which he had set up. In 1838, Aug. 18, he was made commander of an exploring expedition, by which the Samoan and Fiji Islands were carefully surveyed, and many other regions of the s. seas examined, including the Antarctic regions, where he made important discoveries. He published a *Narrative* of the expedition (5 vols. 1845) for which he received the gold medal of the Royal Geog. Soc. In 1849 he published *Western America*; and 1856 *Theory of the Winds*. He was commissioned capt. 1855. As commander of the U. S. steamer *San Jacinto*, 1861, he forcibly removed from the Brit. mail-steamer *Trent* John Slidell and James M. Mason, commissioners of the Confederate States to Great Britain and France, and conveyed them to Boston, receiving the thanks of congress and the acclamations of the people; but at the demand of the Brit. government, his act was disapproved by the executive authority of the United States, and the commissioners were surrendered to the jurisdiction from which they had been taken. The U. S. govt. based this surrender on the fact that, though the Confederate commissioners and their documents were liable to capture as contraband of war, the Brit. vessel should have been taken into port for adjudication by a prize court; whereas W. had taken off his prisoners and conveyed them to Fort Warren, in Boston Harbor—thus, as a judge, exercising the illegal ‘right of search.’ In 1862 he was promoted commodore, and placed first on the list; and 1863 commanded a squadron in the W. Indies, where he captured many blockade-runners. In 1866 he was commissioned rear-admiral on the retired list.

WILKES, JOHN: noted public character, the champion, in his days, of free representative government in Great Britain: 1727, Oct. 17—1797, Dec. 27; b. London. His father, a brewer or distiller at Clerkenwell, sent him to the Univ. of Leyden, where he received an excellent education. On his return to England 1749, he married an heiress, Miss Mead, ten years his senior. His good manners, learning, ready wit, and open table secured him many friends; but extravagance and dissipation soon involved him in difficulties. He and his wife separated, and in a lawsuit which followed, facts came out most damaging to his character. He was nevertheless named high sheriff of Buckinghamshire, and 1757 was returned to parliament as member for Aylesbury. In the house, he joined in the popular clamor against Lord Bute (see BUTE, JOHN STUART); and 1762, June, founded a paper—the *North Briton*—in which he denounced him with such vigor as to drive him from the ministry. W. attacked with equal bitterness the next ministry, insinuating that though Greville was nominally at the head of affairs, Lord Bute still had the ear of the king. In the 45th number of the *North Briton*, he charged

## WILKES.

the king with having uttered a falsehood from the throne; and in consequence, W.'s house was entered and his papers were seized. He was committed to the Tower, on a general warrant; but was released by Chief-justice Pratt, on account of his privilege as a member of parliament. His paper was burned, by order of the house of commons; but a riot ensued, showing that public sympathy went with Wilkes. W. next instituted proceedings against the under-sec. of state for the illegal seizure of his papers; and he obtained £1,000 damages—a declaration being at the same time made by the chief-justice that general warrants are illegal. W. then went to France, on the plea of bad health, and was expelled from the house of commons. In his absence, he was convicted of having printed privately an obscene poem, *Essay on Woman*, of which he was one of the authors: it was hoped that evidence of his immoral character would disgust the public with him. But the copy of the book on which the prosecution had been founded had been obtained surreptitiously from a printer employed; and when this fact became known, the steps taken by the government, instead of injuring W., only added to the outcry against the ministers. On the formation of a new ministry under the Duke of Grafton, W. returned to England, and, becoming a candidate for Middlesex, harangued great crowds in London. After his election, he was arrested, in consequence of his outlawry; but on the way to prison was rescued by a mob: after the mob had dispersed, however, he voluntarily gave himself up to justice. When parliament met, a crowd assembled to convey him to the house of commons. A riot took place, and the military were ordered to fire on the mob in St. George's Fields: many persons were wounded, and one was killed. The coroner's jury returned a verdict of murder against the magistrate who had given the order to fire; and he was tried for that crime, but acquitted. W., having secured a copy of a letter from Lord Weymouth to the chairman of the Lambeth Quarter Sessions, in which it was recommended that the military should be employed to suppress disturbances in London, published it with a preface, in which he charged the sec. of state with having planned 'the massacre in St. George's Fields.' The house declared the preface to contain a seditious libel, and W. was again expelled. He was after this re-elected several times as member for Middlesex; but the elections were declared void. Colonel Luttrell, who vacated his seat and opposed him, obtained only 296 votes against 1,143 for W.; but he was declared duly elected, in defiance of a protest from the whole country. This raised a storm of public indignation; W., still in prison, was now recognized as the champion of public liberty, and became the most popular man in England. •See REPORTING, BRITISH PARLIAMENTARY. In 1769 he obtained a verdict in the court of common pleas against Lord Halifax, the leading sec. of state, with £4,000 damages. He was shortly afterward discharged from prison on giving a bond for good behavior during seven years. In 1774 he was chosen lord mayor of



## WILKES-BARRE.

London, and again returned to parliament for Middlesex, which he represented for many years. In 1782 the resolution by which he had been declared incapable of re-election was expunged from the minutes of the house of commons, as subversive of constitutional rights. The other resolutions relating to W. were at the same time expunged. Two years later he withdrew from the house of commons. He died in Grosvenor Square, London. W. was a contemporary of the author of the famous *Letters of Junius*, and 13 of the private notes found in the collection are addressed to him.

WILKES-BARRE, *wilks'bär-î*: city, port of entry, and cap. of Luzerne co., Penn.; on the Susquehanna river, and on the Central of New Jersey, the Delaware Lackawanna and Western, the Lehigh Valley, the Pennsylvania, and the Delaware and Hudson Canal Co.'s railroads; 18 m. s.w. of Scranton, 144 m. n.-by-w. of Philadelphia; popularly known as 'the Black Diamond City.' It is in the beautiful valley of the Wyoming, and is underlaid by rich anthracite coal-measures. The principal industry is in connection with coal mining; though there are large iron, foundries, machine-shops, locomotive-works, axle factories, wire-rope works, car-shops, and silk and lace mills. There is also considerable trade in lumber. The city is substantially built; has gas and electric light plants, mountain-water supply, street railways connecting it with suburban villages, and a double-track railroad-bridge across the river, connecting with Kingston. In 1901 there were 3 nat. banks (cap. \$975,000), 3 savings banks (surplus \$339,000), 1 state bank (cap. \$250,000); 1 private bank; 4 daily, 16 weekly, and 1 monthly periodicals. There were 20 public-school buildings; 4 libraries; and 39 churches—viz., Meth. Episc. 12, Presb. 6, Bapt. 3, Congl. 3, Prot. Episc. 3, Luth. 3, Rom. Cath. 3, Hebrew 3, Evang. 1, Polish Cath. 1, and Ref. 1. Among the prominent buildings are the court house (cost \$175,000), stone prison (cost \$200,000), opera-house (cost \$120,000), city hospital (cost \$30,000), female seminary, high school, home for friendless children (cost \$100,000), Wyoming Athenæum, and the buildings connected with the driving-park. The quarters of the Wyoming Hist. and Genealogical Soc. contain a valuable collection of antiquities and geological specimens.—The tp. was surveyed 1770, and the town laid out 1772 by Maj. Durkee, who gave it its present name in recognition of the cordial defense of the rights of the American colonists, in the British parliament, by John Wilkes and Isaac Barré. W. was incorporated as a borough 1806, and chartered as a city 1871. The poem *Gertrude of the Wyoming*, by Thomas Campbell (q.v.), owed its inspiration to an unusually brutal massacre by the Indians 1778, July 3. The event was commemorated by the erection of a granite monument over the remains of the victims on the centennial anniversary of the massacre. In a sudden cyclone 1890, Aug. 10, 12 persons were killed and 9 others fatally or severely injured, and much property was destroyed.—Pop. (1880) 23,339; (1890) 37,718; (1900) 51,721.

## WILKIE.

WILKIE, *ווילקי*, Sir DAVID: Scottish painter: 1785, Nov. 18—1841, June 1; b. Cults, in Fifeshire, of which parish his father was minister. His boyish passion for art was so strong that his father, with reluctance, sent him to the Acad. at Edinburgh 1799. Here he greatly distinguished himself; and returning home 1804, he painted his *Pitlessie Fair*, a piece which, though the work of an unknown stripling, brought him the sum of £25. Shortly afterward W. went to London, intending to return to Scotland after a year or two of study; but the great success of his picture, *The Village Politicians*, determined him to settle in the metropolis. Not that he was very greatly benefited pecuniarily, £30 being all that the Earl of Mansfield could with difficulty be induced to pay for the picture; but the originality and humor of the work greatly captivated the public, and at once established the reputation of the painter, who soon had commissions in plenty, at greatly advanced prices. In 1809 the Royal Acad. ratified the favorable verdict of the public by electing him an associate; and two years afterward he was advanced to the rank of academician. In 1814, in company with his friend Haydon, he visited Paris, and inspected with great delight the art-treasures at the Louvre. In 1817, while the guest of Sir Walter Scott at Abbotsford, W. painted his well-known picture of the great poet and his family. During these years W. had been engaged on the series of pictures on which mainly his fame rests; pictures familiar by engraving (the *Blind Fiddler*, *Card Players*, *Rent Day*, *Jew's Harp*, *Village Festival*, *Blind Man's Buff* [1813], *Distraining for Rent*, *The Penny Wedding*, [1818] *Reading of the Will*, etc.), in which the homely humors of humble life are expressed by a vehicle appropriately simple, and of charming purity and transparency. In this style, distinctively his own, his genius is commonly held to have culminated in *The Chelsea Pensioners listening to the News of Waterloo* (1820, 1). This work was a commission from the Duke of Wellington, who paid the artist 1,200 guineas (\$6,132) for it. In 1822 he visited Edinburgh, during the progress of George IV.; and in the following year was appointed royal limner for Scotland. In 1824-5 he travelled extensively on the continent of Europe for his health. After this tour a marked change appeared in his style: he sought to emulate the depth and richness of coloring of the old masters, and deserting the homely life, which he could treat so exquisitely, chose elevated and even heroic subjects, to the height of which he could never rightly raise himself. The florid picture (1830), *George IV. entering Holyrood*, illustrates the unwise change. W., however, remains memorable; not for the quasi-high art of his later years, but for the simpler, truer, and, in the proper sense, higher art of his earlier time. He never ceased to be popular, and honors continued to be showered on him. In 1830 he was made painter in ordinary to his majesty; and he was knighted 1836. In 1840, seeking to re-establish his health, he visited Syria, Palestine,



## WILKINS—WILKINSON.

and Egypt; but died on his voyage home, off Gibraltar, and his body was committed to the deep.

As a genre-painter and an illustrator of Scottish character and manners in humble life, W., in his best pictures, may take rank with Burns in poetry and Scott in fiction. As a man, he was kindly, warm-hearted, and generous.—See *Life* by A. Cunningham (1843) and J. W. Mollet (1881).

WILKINS, MARY ELEANOR: writer of fiction: 1864—  
———; b. Randolph, near Boston, Mass.; related through her father to the historian Motley. She was educated at Brattleboro, Vt., and at Mount Holyoke Seminary. Her first story, *A Humble Romance* (1887), gave her distinction as a delineator of New England character, and subsequent writings have revealed her exceptional power in that field. In 1895 she won a \$2,000 prize with a story called *The Long Arm*. She was married to Dr. Charles M. Freeman, 1902, Jan. 1. Among her publications are: *A New England Nun, and Other Stories*; *The Pot of Gold*.

WILKINSBURG, *wil'kinz-bérg*: borough in Allegheny co., Penn.; on the Pennsylvania railroad; 7 m. e. of Pittsburgh. It is in an agricultural and mining region; and has car-works, steel-works, iron-foundry, and flour-mill. There are 8 churches and 1 weekly newspaper. The principal business is in connection with coal-mining.—Pop. (1880) 1,529; (1890) 4,662; (1900) 11,886.

WILKINSON, *wil'kin-son*, JAMES: revolutionary soldier and traitor: 1757–1825, Dec. 28; b. Benedict, Md. After medical studies, he joined the army early in the revolution; was capt. in Arnold's Canada expedition; maj. on Gen. Gates's staff; adjt.gen. at the battles of Bemis's Heights and Stillwater; took the credit, belonging to another, of a heroic night-inspection of the enemy's force and position, and by this deceit became brevet brig.gen.; but under the influence of drink, disclosed his part in intrigue to make Gen. Gates commander-in-chief instead of Washington; and, after the petition to congress by nearly 50 officers to annul his promotion, resigned the appointment. Removing to Ky. after the war, he intrigued with the Spanish gov. of Louisiana for the exclusive trade down the Mississippi, and soon afterward for setting up a rival republic in the west, he to be pensioned by Spain—a scheme that was disclosed and defeated, but which postponed the Louisiana purchase and cost the United States many years of Indian warfare instigated by the Spanish. To keep Wilkinson out of mischief (though even then secretly receiving his Spanish pension), he was again made brig.gen. 1792 in the n. w. Indian wars. In 1805 he became gov. of La., and (as some believe, originating the Burr treason) he turned traitor to treason, revealing Burr's scheme to the government. The proof of his suspected treacheries which has since been obtained, was not then sufficient when court-martialled he was acquitted, and died in the city of Mexico.—He wrote *Memoirs of My Own Times* (1816). See Gilmore's *Advance-guard of Western Civilization* (1887).

WILKINSON, Sir JOHN GARDNER: English traveller and archeologist: 1797, Oct. 5—1875; son of the Rev.

## WILKINSON.

John W., of Harrowdale, Westmoreland. He was sent to Harrow School 1813, and to Exeter College, Oxford, three years later; and while a student showed taste for architecture, for antiquities, and for travel. In 1821, Oct., he went to Egypt, learning Arabic and studying Coptic at Cairo; and then, through his stay of 12 years, exploring almost every part of Egypt and Lower Nubia. Twice he ascended the Nile as far as the Second Cataract; and several times as far as Thebes, giving more than 12 months to explorations at the latter site; and in subsequent visits completing the exploration of the deserts and the oases. In 1833 W. returned to England; but again visited Egypt 1841 and 42—on the last occasion extending his tour to other lands. In later years he made two more visits to Egypt.—Among his numerous publications are the following: *Topography of Thebes, and General View of Egypt* (Lond. John Murray 1835); *Manners and Customs of the Ancient Egyptians, including their Private Life, Government, Laws, Arts, Manufactures, Religion, and Early History; derived from a Comparison of the Paintings, Sculptures, and Monuments still existing with the Accounts of Ancient Authors: illustrated by Drawings of Those Subjects* (3 vols. Lond. 1837)—a work of great popularity, which obtained knighthood for its author; *Manners and Customs*, etc., new ed. of the foregoing, much enlarged, issued by Dr. Birch (1879, 3 vols. illustrated); *Modern Egypt and Thebes—with Wood-cuts and a Map* (2 vols. Lond. Murray 1843); *The Architecture of Ancient Egypt, with a Large Volume of Plates* (Lond. 1850); *The Egyptians in the Time of the Pharaohs—with Introduction to the Study of Egyptian Hieroglyphs*, by S. Birch (Lond. 1857). W. also contributed notes to the Rev. G. Rawlinson's edition of *Herodotus*. To the Brit. Museum he gave many objects of antiquarian interest; and he presented to Harrow School his collection of about 1,000 coins, and his large collection of Egyptian, Greek, and other antiquities.

WILKINSON, WILLIAM CLEAVER, D.D.: author: b. Westford, Vt., 1833, Oct. 19. He graduated at Rochester Univ. 1857, and at the theol. seminary connected with it 1859; was pastor of the Wooster Place Bapt. Chh., New Haven, Conn., two years; travelled abroad; was tutor in Rochester Univ.; pastor in Cincinnati several years; and founded a school in Tarrytown, N. Y., returning to that place after a professorship in Rochester Theol. Seminary 1872-81; after which he became prof. of poetry and criticism in the Univ. of Chicago. His style as a writer shows much force and finish. He is counselor of one of the Chautauqua circles, dean of the dept. of literature and art, and author of text-books in languages for Chautauqua students. He has published *The Dance of Modern Society* (1869); *A Free Lance in the Field of Life and Letters* (1874, severely reviewing James Russell Lowell among others); *The Baptist Principle* (1881); *Webster: an Ode* (1882); *Poems* (1883); *Edwin Arnold as a Poetizer and Paganizer* (1884, with an examination of *The Light of Asia*); *The Epic of Saul* (1891); *The Epic of Paul* (1897).



WILL, n. *wil* [Goth. *viljan*; Dan. *ville*; Dut. *willen*; Ger. *wollen*; Icel. *vilja*; L. *velle*, to have will, to be desirous of: Russ. *volja*, will, wish: comp. Gael. *àill*, desire, pleasure]: the power of determining or choosing (but see below); discretion; power; pleasure; inclination; intention; determination; that which is wished or desired; command; direction; disposition; a formal declaration in writing of what a person desires to be done with his real or personal estate after death; the written document containing such instructions (see WILL, in Law): V. to desire that anything should be done or not be done; to determine; to direct; to choose; to enjoin; to dispose of by *will* or testament; to command; to be inclined or resolved to have. WILL'ING, imp.: ADJ. inclined to anything; not disposed to refuse; ready; voluntary; consenting. WILLED, pp. *wild*. WILL'INGLY, ad. *-li*, in a willing manner. WILL'INGNESS, n. *-nēs*, free choice or consent of the will; readiness of the mind to do or to refrain from doing. WILFUL, a. *wil'fúl*, governed by the will without regard to reason; stubborn; obstinate; inflexible; done or suffered by design. WIL'FULLY, ad. *-li*, obstinately; stubbornly; by design; on purpose. WIL'FULNESS, n. *-nēs*, obstinacy; stubbornness. AT WILL, at pleasure. GOODWILL, favor; kindness. GOODWILL OF A BUSINESS, business connections and other advantages, so far as they can be disposed of, assigned by a disposer to his successor, viewed apart from furniture, stock-in-trade, tools, or the like. FREEDOM OF THE WILL, the doctrine of the freedom of the human *will*, as opposed to the doctrine of necessity. ILL-WILL, enmity; malice. TO HAVE ONE'S WILL, to obtain what is desired; to do what one desires.—SYN. of 'willing': pleased; desirous; favorable; complying; chosen; spontaneous.

WILL, v. *wil* [the same as WILL 1]: a defective verb used with another verb (i.e., as an auxiliary) to express future time; in the first person, *will* promises or expresses fixed purpose or determination, as, 'I *will* eat;' in the second and third, *will* simply foretells, as, 'thou *will* eat,' 'he *will* eat.' WOULD, pt. of will, *wúd*: see SHALL: SHOULD: WOULD.

WILL: term used in various meanings in the philosophy of the mind and in Ethics (q.v.). The Mind is divided into three distinct functions—Feeling (see EMOTION), Intellect or Thought (see INTELLECT), and Will. But Will is used in a variety of senses: 1. *Impulse*, whether occasional or habitual; and in this sense, so far as common to man and the lower animals, it denotes the tendency to activities that are not merely unconsciously reflex, yet are below the level of choice. 2. *Choice*, not involving moral freedom, between greater and less of lower good, or one or another phase of it; and this might occur in a nature not rational, perhaps. 3. *Rational choice*, between a higher and a lower good, of which rational beings alone are capable; here only does true freedom of will properly come in (see FREE-WILL). 4. *Volition*, a word properly applied to particular executive acts of No. 2 or No. 3, i.e., acts of willing. 5. A *permanent state of choice*, influencing and giving rise to vo-

## WILL.

tions, and signified in rational beings by what is called the ruling purpose of life.

The word Will is often misapplied to affections, desires, wishes, etc., which belong to another department of mind. The word *wish* is especially unfortunate, except as convenient in unphilosophical use; it may mean only desire, even opposed to choice, or it may mean a volition. The peculiarity of action from Will, in contrast to other activities, as the powers of nature—wind, gravity, etc.—is its being preceded or inspired by *feelings*, by pleasures and pains, or, in the highest sense, by moral reasons *versus* pleasures and pains.

To discriminate on this subject, it should be noticed that in the lowest sense, namely Impulse, which is not Will proper, there is to be considered, first, the self-acting energy of the system, whereby movements arise without waiting the stimulus of the senses. Any actively disposed animal, after rest and nourishment, begins to move merely through a surplus of nervous power, and not because it is wakened out of dormancy by the solicitations of sensible objects: see SPONTANEITY, DOCTRINE OF.—Next, there is the tendency to abide by a movement giving pleasure, and to relax a movement coincident with pain. From the first movements of sentient life, every animal appears to possess this property. Without our going through any process of deliberation or resolution, we sustain an activity that brings us agreeable sensation, and remit an activity ending in pain. We keep our eyes fixed on a cheerful flame, and withdraw them when the glare is overpowering: the process is self-acting and intuitive: see EMOTION. All this is of the nature of reflex nervous action, such as that which might occur in sleep, e.g., changing position unconsciously for relief.—Another fact is the operation of the Retentive power of the mind, in joining together, by a permanent association, movements and feelings that have existed together. This is a branch of the great law of Association which, operating much more quickly, powerfully, and permanently in creatures devoid of the human or logical reasoning power, explains probably the mystery of many instincts, and certainly the superhuman ‘sagacity,’ of many animals: see ASSOCIATION OF IDEAS.

Rational Will, involving moral choice when deciding between higher and lower good, has nothing in common with the reflex and the impulsive activities, except that all the action of our nature tends to become spontaneous when habitual—a result that happily renders wise or righteous life a kind of second nature, even as it unhappily makes a foolish or wrong life at last deeply ingrained. The attempt of sensationist philosophers, from time to time and under new forms of statement, to evolve the highest human attributes out of the lowest animal phenomena, has no show of success except in ignoring all that is most essential in those attributes. The progress of knowledge is certainly not in confusing distinctions, and its ultimate generalizations, by which diverse things are brought under one law, are worth nothing if attained at the expense of



fundamental facts and truths. The common facts of human consciousness are the most directly and surely known of any whatever, however men may differ in their philosophies. It is the initial fact that we, and our fellows so far as we observe, are conscious that we might have chosen, or in other words set our will, in a wiser way when we have chosen folly, and in a right way when we have chosen wrong.

It may be granted readily that, considering heredity, environment, habit, and a large admixture of impulses, our rational freedom is reduced almost to Dr. O. W. Holmes's comparison of a mobile drop of water inclosed in a crystal. Granting the utmost, that to which it is reduced is still the power, on due deliberation, of forming a great generic purpose, whether in the line of earthly or spiritual wisdom; and such a purpose has power (at first gradually it may be, but at last completely) to shape, color, direct, all our subordinate or specific preferences, choices, and volitions. This follows as surely as when the choice of a profession, or the plan of a journey, modifies and controls all of a man's thoughts, feelings, and acts. Every blade and bough of our nature incline in the direction in which the wind of a generic purpose is set. One of the recent attempts to escape some new phases of determinism is that of Prof. James of Harvard (*Scribner's Monthly*, 1887); he discusses the common fact that ideas or images occupying the mind come to have an impelling power; and, though he seems to confine ideas to images and to invest these with a self-activity, entity, and power that rather belong to the ego, he justly comes to the conclusion that we have some freedom left in our ability to dismiss one set of ideas or images and entertain a better set. (Dr. McCosh makes Attention the first step in acts of the Will.) This gives a rule of practical, every-day importance, but it does not express adequately nor rise to the height of the truth that a man can 'make up his mind' (a very significant common phrase) to a course of action. The course having been decided, it may be conceded that all the executive volitions, and even subordinate permanent choices, follow by any sort of necessity consistent with the nature of mind. The course having been decided, the right ideas will find place to the exclusion or subjugation of others.

The history of discussions of the Will is one for the most part of ingenious subtleties, and to a considerable extent of jugglery with words. The most celebrated treatise is that by Jonathan Edwards; and his argument is that 'as the supposition is that all our volitions are caused by ourselves, the causal act must be caused by another, and so on infinitely.' But his favorite 'strongest motive,' as governing cause, on this reasoning must act in order to act, and so on infinitely. As to liberty, he understood it to be the power to do as one wills; but this does not meet the question. Some of his later followers express it as the power to do or choose or will as we please. But the question is, Can we please, like, choose, will, as we ought? The view in the previous paragraph answers this. In contrast



## WILL.

with most theological writers on this subject, Albert T. Bledsoe, LL.D., in his examination of Edwards on the Will, aptly speaks of the Will as the determiner, neither self-determined nor determined at all. See FREE-WILL: ETHICS: also works on the Human Mind and on Ethics, especially Calderwood's *Hand-book of Moral Philosophy*. For a different view, see Bain on *The Emotions and the Will*. For a curious philosophy of the Will, see SCHOPENHAUER: PESSIMISM.

WILL, or TESTAMENT, in Law: a writing by which a person entitled to property declares what is to be done with such property after his death. Will is a general term, and covers the disposition of both real and personal property; while *testament* is properly applied to personal estate only; but the distinction is seldom observed, and the common designation 'last will and testament' is the phrase used whether real or personal estate is to be disposed of, or both. The term *will* includes codicils. A writing is indispensable to a will, except in the case of soldiers or sailors who, because of their occupation, and while in actual service, are allowed to make a verbal or nuncupative will; but this exception extends only to their personal estate, and they must make a written will, like other persons, in order to deal with their real estate. All nuncupative wills must be made in the immediate prospect of death.—In England and Ireland, an infant, or person under 21 years of age, cannot make a will. A married woman can make a will only when she has separate property, or when her husband assents to her will, or when she makes the will by virtue of some power of appointment vested in her. As a general rule, it is absolutely necessary that the party making a will should have a free and disposing mind at the time; hence, if he or she be an idiot, or a lunatic, or drunk, or acting under compulsion, fear, or undue influence, the will is invalid. There is no limit as to the time preceding death when a will may be made; it is enough that the testator was at the time capable and sensible, though he died immediately afterward. In general a will must be executed in presence of two or more witnesses, who see the testator sign the will, or at least hear him acknowledge it. But there is no particular form of words in which a will must be made for the purpose of disposing of either realty or personalty. The will must be in writing, but not necessarily in ink or written continuously. The testator may sign by his mark or by an assumed name. Though a seal is not equivalent to signature, yet a person may have a stamp to sign papers with, and that will be sufficient for a will also. The testator need not sign the will if he authorize some one to do so for him in his presence. The signature must be at the foot or end of the will; but if it is placed so as to lead a court to the conclusion that it was intended to give effect to the will, that will be enough. Though the witnesses need not know it is a will, they must be present together when the testator signs it or acknowledges his signature. The witnesses must sign their names or make their marks,

## WILL.

A legatee, or the wife or husband of a legatee, may be an attesting witness, but by being so, he or she will forfeit any legacy left to him or her by the will. But one may be an executor though he attests the will. A will is revoked by the marriage of the testator or testatrix. The mere fact of making a subsequent will does not of itself operate to revoke a prior will, unless there is some inconsistency in whole or in part; and, as a general rule, no will will be revoked by any presumption of an intention on the ground of an alteration in circumstances. The usual way of revoking a will is to burn, tear, or destroy it with the intention of revoking the same; or by executing another will which expressly revokes the prior will. When a testator tears or cuts away that portion of his will containing the signature and attestations, the presumption is that he intended to revoke the whole. But merely cutting out a part of the will, or striking it through with a pen, does not amount to a revocation. It is to be borne in mind that, in order to revoke by tearing, etc., there must be an intention to revoke, so that a mere accidental tearing will prevent the act from having the force of revocation. When there are interlineations or alterations in a will, it is presumed these are made after signature, unless there is evidence to prove the contrary. A will which is in any manner revoked can be revived only by re-execution, or by a codicil showing an intention to revive it; but many nice questions have arisen as to what causes a will to revive. See EXECUTOR: LEGACY: PROBATE: ETC.—In Scotland a will is used only to denote a testament affecting personal or movable property; while a will affecting real or heritable property can be made only by way of a deed having a present operation. A will or testament may be written in the handwriting of the testator, and if signed by him, will not require witnesses, being then called a holograph will. In other respects, wills are subject to nearly the same rules which prevail in England with respect to revocation, etc. Wills of real property are called Dispositions or Deeds, and have a present operation, and the mode in which they are drawn up is that of conveying the property to the donee, but reserving the testator's liferent. The effect of this is that the testator retains the property in his own hands while he lives; but at the moment of his death, the disposition *mortis causa* comes into play, and the donee then takes the property, subject to the deed: see DEED.

In the United States the law relating to wills corresponds in the main with that of England and Ireland. Several modifications, however, have been introduced by statute in some of the states. In most, the age of testamentary capacity is 21 years, or 'full age.' In Cal., Conn., and Nev., it is 18; in Colo., Ill., Md., and Dist. of Columbia, 21 for men, and 18 for women; in N. Mex., 14 for men and 12 for women. In Ark., Mo., Or., and Va., 21 is the usual age; but personalty may be disposed of at 18, and in Colorado at 17 if the person be 'of sound mind and memory.' As in England, only personal property can be disposed of by nuncupative will; but the amount varies in different



states, from \$100 in N. H. to \$200 in N. C., \$250 in Tenn., \$300 in Io. and Mich., \$500 in Ala. and Ark., and \$1,000 in Cal. and Nev. Usually two witnesses are required, but in some three, as in Fla. and N. H., and in N. Mex. 5. The will itself must be reduced to writing very shortly after being uttered, the period allowed for this varying from 6 days in Fla., N. H., and Tex., to 10 days in N. C., Ohio, and Tenn.; 30 days in Cal., and 60 days in most other states; and it must, as a rule, be probated within 6 months—in some states, as in Nev., in 3.—The Homestead Law (q v.) in some states affect the validity of a will, by making void a husband's devise of homestead land, and in some states only a portion of the disposable property can be willed away so that children cannot be disinherited without good cause; and in some jurisdictions, Ohio, Penn., etc., bequests for any benevolent, religious, educational, or charitable purpose, as against children and their legal representatives, are void unless the will be executed a certain specified time before the death of the testator—in Ohio one year, in Penn. one month. Married women cannot impair the husband's right as a tenant by the courtesy, as in Or. and R. I.; and in certain other states, as in Colo., they may not leave more than half their property away from their husbands. In some states, as in Del., women must have the written consent of their husbands, given under hand and seal in the presence of two witnesses, to dispose by will of their property, whether real or personal. In La. the law—mainly according to the French system—is peculiar and elaborate: there are four kinds of wills: (1) *Nuncupative wills by public act*, in which the testament is dictated to a notary and by him written down in the presence of three witnesses, read by the notary to the testator in presence of the witnesses, and signed by the testator and at least one witness. It is essential in this form of will that all the formalities be fulfilled at one time without interruption or turning aside to other acts. (2) *Nuncupative wills by private act*, in which the will is written by the testator himself in presence of 5 witnesses, read to them by the testator or by one of the witnesses, and signed by the testator and at least two of the witnesses. (3) *Mystic or sealed wills*, in which the document purporting to be the disposition of the property is placed in a paper or envelope which must be closed and sealed. Thus closed and sealed it is presented by the testator to a notary and seven witnesses, declaring in their presence and hearing that it contains his last will and testament written by himself (or by another) and signed by him. The notary then draws up the act of superscription which is written on the closed envelope or paper, and signed by the testator, the notary, and the witnesses, or at least two of them. It is essential that all this be done continuously without interruption or break of any kind. (4) *Holographic wills*, which to be valid must be written, dated, and signed entirely by the hand of the testator. By the existing laws of the state of La., no one can dispose of his whole estate if he have children.



In the Dominion of Canada, the law in regard to wills is partly French and partly English. In the province of Quebec, wills are of three kinds: (1) *The Authentic or French will*, made before two notaries or a notary and two witnesses (males only); (2) *The English will*, made in the presence of two witnesses (male or female); (3) *Holographic wills*, which must be written and signed entirely by the testator, but which require neither notaries nor witnesses.

WILLAMETTE, *wil-á'mét*, RIVER: river of Oregon, branch of the Columbia. It rises in three small streams in the Cascade Mts., which streams unite at Eugene City, and flow thence n.w. and n., and empty into the Columbia about 12 m. below Portland; length nearly 300 m. It receives throughout its course a number of tributaries from the east and west. Willamette Falls, at Oregon City, 25 m. from its mouth, formerly obstructed navigation, but a canal with locks has been constructed at a cost of about \$500,000, and the river is now navigable for light vessels in summer to Eugene City, about 126 m. It is navigable for ocean steamers to a few m. above Portland.

WILLARD, *wil'érd*, EMMA C. (HART): educator and author: 1787, Feb. 23—1870, Apr. 15; b. Berlin, Conn.; daughter of Samuel Hart, descendant of the Rev. Thomas Hooker, first minister of Hartford. While preceptress of Middlebury Acad., Vt., she married Dr. John W.; and there in 1814 established a girls' seminary, with innovations on the prevailing system, which she set forth in an address, *A Plan for Improving Female Education*, 1819. This she submitted to Gov. Clinton of N.Y.; and, with aid from the state acad. fund, she opened a school in Waterford, N. Y., the same year, but removed it to Troy 1821, that town having erected a building for the enterprise. It became the famous Troy Female Seminary, continued by her son after her retirement 1830. She devoted the profits of one of her books to a normal school for women in Greece. She travelled extensively in this country, lecturing on education, to which, especially for women, she gave great impulse, so that she is regarded as the pioneer in its modern stage of development.—Besides her well-known text-books in history, geography, etc., she published a vol. of foreign travel; a treatise on blood-circulation; another on respiration; *Morals for the Young* (1857); and poems. She died in Troy. Her life was written by John Lord, LL.D., 1873.

WILLARD, FRANCES E.: educator and philanthropist: b. Churchville, N. Y., 1839, Sep. 28. She graduated at the Northwestern Female College, Evanston, Ill., 1859; became prof. of nat. science there 1862; was principal of Genesee Wesleyan Seminary 1866-7; travelled abroad, studying in Paris, and writing for periodicals, 1869-71; and 1871 became prof. of æsthetics in Northwestern Univ., Evanston, and dean of the Woman's College. In this position she distinguished herself by developing original views of self-government by students, which have been widely ac-

## WILLARD—WILLCOX.

cepted among educators. From 1874 Miss W. retired from college work to devote herself wholly to the work of the Woman's Christian Temperance Union, to whose development and influence her character and ability have remarkably contributed. She held the position of corresponding sec. until 1879, and organized the home-protection movement; and since 1879, as pres., she has wisely and ably directed the activities of the organization. At the death of her brother, Oliver A. W., she took his place as editor of the *Evening Post*, Chicago. From 1882 she undertook political work as a member of the executive committee of the prohibition party. In 1886 she became the recognized head of the White Cross movement within the temperance unions of women, and was successful in securing in many states special enactments for protection of women. In 1883 she founded the World's Christian Temperance Union, and 1888 became its pres., and pres. also of the American branch of the International Council of Women. Among the published writings of Miss W. are: *Nineteen Beautiful Years* (New York 1863 and 77); *Hints and Helps for Woman's Christian Temperance Work* (New York, 12mo); *Woman and Temperance; or, the Work and the Workers of the W. C. T. Union* (Hartford 1883); *How to Win: a Book for Girls* (New York 1886); *Woman in the Pulpit* (Boston 1888); *A Great Mother* (1893); and many pamphlets and articles in magazines. She died in her 59th year, Feb. 17, 1898.

**WIL'LARD, SAMUEL:** Congregational minister: 1640, Jan. 31—1707, Sep. 12; b. Concord, Mass.; son of Simon W. (q.v.). He graduated at Harvard 1659; studied theology; was pastor at Groton 1663-76; at the Old South Church, Boston, 1678-1707; and vice-pres. (acting pres.) of Harvard 1701 till his death. He boldly opposed the persecutions during the 'witchcraft delusion' 1692. Besides numerous sermons and treatises, he published: *Ne Sutor ultra Crepidam, or Brief Animadversions upon the New England Anabaptists' Late Fallacious Narrative* (1681); *Mourner's Cordiall against Excessive Sorrow* (1691); *Peril of the Times Displayed*; and he left MSS. which were published as *A Compleat Body of Divinity in Two Hundred and Fifty Lectures on the Assembly's Shorter Catechism* (Boston 1726), said to be the first miscellaneous folio volume published in this country.

**WIL'LARD, SIMON:** 1605, Apr.—1676, Apr. 24; b. Horsemonden, England. He came to New England 1634, and was one of the founders of Concord, Mass. He was clerk of Concord 1635-53; representative in the legislature 1636-54; councilor 1654-76; and was a maj. of militia in King Philip's war. Later he became a magistrate in Salem.

**WILL'COX, ORLANDO BOLIVAR:** soldier: b. Detroit, Mich., 1823, Apr. 16. He graduated at West Point 1847, and was assigned to the 4th artillery; served in the last part of the Mexican war, on frontier duty, and against the Seminoles. He resigned his commission 1857, Sep. 10,

## WILLEMS—WILLEMSTAD.

studied law, and practiced at Detroit until the civil war. 1861, May 1, he was made col. of the 1st Mich. regt.; and commanded a brigade at Bull Run, where he was wounded and taken prisoner; 1862, Aug. 17, exchanged and commissioned brig.gen. of vols. to date from 1861, July 21; served in the Maryland and Rappahannock campaigns; commanded the districts of Ind. and Mich. during the draft riots; commanded a division in the 9th corps of the Army of the Potomac in the Richmond campaign; 1866, Jan. 15, was mustered out of service, and returned to his law practice. 1866, July 28, he was recommissioned in the regular army as col. of the 29th infantry; 1867, Mar. 2, brevetted brig.gen. for Spottsylvania and maj.gen. for Petersburg; 1886, Oct. 13, became brig.gen.; 1887, Apr. 16, was retired from the service.

WILLEMS, *wil'lems*, JAN FRANZ: Flemish philologist and writer, noted as one of the originators of the Flemish national movement (see FLEMISH LANGUAGE AND LITERATURE): 1793–1846; b. Bouchout, near Antwerp. W., at the age of 12, was sent to the town of Lierre, to learn music. There he attracted attention by his acting and his satirical verse-making in connection with some ancient literary societies; and some persons at Lierre sent him to Antwerp, to study in the office of a notary. In 1811 he contended successfully for the prize awarded for the best poem on the battle of Friedland and the peace of Tilsit. From this period his poetical and dramatic compositions followed in rapid succession. His ode (1818) *Aen de Belgen* (To the Belgians), in which he exhorted his countrymen to resume the use of their native Flemish; and his clever treatise on *De Nederduytsche Tael en Letterkunde* (1819–24), in which he traced the history of the Flemish and Dutch tongues, mark an epoch in the literary history of Belgium. The Dutch government showed their approval of his anti-French tendencies by giving him an official appointment; but the Rom. Cath. party in Belgium, resenting his attempt to refer the decline of Belgian national renown to the abandonment of the Flemish vernacular, regarded him with mistrust; and when Belgium was definitely separated from Holland 1830, the dominant Belgian party deprived W. of his office. In 1835 he was appointed keeper of the archives at Ghent, where he resided in honor till his death. Among his many Flemish works was a version of the mediæval poem *Reineke Vos*, or *Reynard the Fox*, for which he claimed a Flemish origin.

WILLEMSTAD, *wil'lem-stád*: fortified town of the Netherlands, prov. of N. Brabant; on the Hollandsdiep: 19 m. n.w. of Breda. W. was erected by William I., Prince of Orange, to protect the traffic between Holland and Zeeland. There are 7 bastions, 2 forts, 2 inundation sluices, and a good haven. In 1793 Baron van Boetzelaar successfully defended W. against the French, under Dumouriez, who, after a heavy bombardment, were forced to raise the siege. It was the birthplace of the naval hero Callenberg, who, when De Ruyter fell in action with the French, succeeded to the command.—Pop. (1887) 2,088.



WIL'LEMSTAD: chief town of the island of Curaçoa (q.v.).

WILLET, *wil'lět* (*Symphemia semipalmata*): bird of family *Scolopacidæ*; native of both N. and S. America. The name is derived from its note. It is about 15 in. long; brownish gray varied with dusky; rump, upper tail-coverts, and under parts white; tail grayish; tail-feathers, all except the two middle feathers, spotted or barred with dark-grayish brown; secondaries of the wings white, with dark-brown spots. The bill is a little more than 2 in. long, very thick, compressed; wings long; bluish legs long and strong; tail short and nearly square; toes partially webbed. This bird is found in summer in the northern states; in winter it retreats to the Gulf states. The flesh is highly esteemed, and the eggs are reckoned a delicacy. Willets are seen usually in flocks, and near the sea.

WILLET, *wil'lět*, THOMAS: merchant: 1611–1674, Aug. 4; b. England. In 1630 he came to this country from Leyden with Isaac Allerton, and engaged in trade in the Plymouth colony; removed to New Netherlands at the time of its capture from the Dutch; 1650 was commissioner for the New Netherlands to settle boundary questions with New England; 1665, June 12, appointed by Gov. Richard Nicolls first mayor of New York; and Aug. 23 of the same year nominated commissioner of admiralty. When the Dutch retook the colony of New York or New Netherlands, W.'s property was confiscated, and he returned to New England.

WIL'LETT, MARINUS: soldier: 1740, July 31—1830, Aug. 22; b. Jamaica, L. I. He was a lieut. in Delancey's regt. in the French war; distinguished himself in the attack on Fort Ticonderoga 1758; was in Bradstreet's expedition against Fort Frontenac; one of the leaders of the Sons of Liberty in New York; 2d capt. in McDougall's regt. 1775; served in the Canada campaign 1775–6, remaining for some time in command of the port of St. John after its capture; 1776 became lieut.col. of the 3d N. Y. regt.; 1777, Aug. 2, second in command at Fort Stanwix (or Schuyler), where he led a successful sally against St. Leger's regulars, Johnson's royal greens, and the Mohawks under Brant, afterward holding the fort until its relief by Arnold; 1778, June, joined the army in N. J.; and 1779 accompanied Gen. Sullivan in his expedition against the Six Nations. He was sheriff of New York 1784–92, and 1807 appointed mayor of New York. In that city he died.

## WILLIAM I.

WILLIAM, *will'iam*, I., King of England, commonly called WILLIAM THE CONQUEROR: 1027 (or 8)—1087, Sep. 9 (reigned 1066–87); illegitimate son of Robert, surnamed *Le Diable*, Duke of Normandy (see NORMANS). He succeeded to the dukedom on the death of his father 1035. Previous to his father's death, he had been intrusted to the care of Henry I. of France; but it was due rather to the quarrels and jealousies of his own subjects, than to the protection of Henry, that his dominion was preserved intact until his arrival at manhood. In 1047 he gained a victory at Val de Dunes over a powerful competitor, Guido of Macon; and 1054 he defeated another rival, Guillaume, Count of Arques—being aided in both contests by the French. His ambition now began to extend to England, where Edward the Confessor reigned. Visiting England, W.'s hopes of succeeding Edward were strengthened by the dominance of Norman influence in the councils of that monarch. On Edward's death, however, the Witenagemot (q.v.) chose Harold (q.v.) to the English throne; ignoring, according to the monkish chroniclers of Norman bias, an alleged bequest of Edward in favor of William. The Norman asserted his claim by a powerful invasion; and the result was his acquisition of the crown by the famous battle of Hastings, 1066, Oct. 14. Harold having been killed in the fight, the Saxons chose Edgar Atheling as his successor. Edgar was, however, soon compelled to yield, and W. was crowned king of England 1066, Dec. 25. W.'s treatment of the conquered people was at first conciliatory; but his savage suppression of a rebellion, which broke out in the north 1070, laid the foundation of an irreconcilable antipathy between Saxon and Norman, which rendered a continuance of the mild policy impossible; and before long, W. began to rule like a true conqueror. Everywhere the Saxons were reduced almost to slavery. The higher classes were deprived of every office in church and state, while the people were ground down by new and oppressive taxes. Fortresses were erected over the country, and garrisoned, to overawe the Saxon inhabitants. In 1072 the Saxons were so far reduced to submission that W. found time to lead an army across the border into Scotland, to punish the king of that country, Malcolm Canmore, for having received and protected Edgar Atheling. The conqueror marched as far n. as the Tay, and received a nominal submission from Malcolm. In 1085 an attempt was made to overturn the power of the English king by Canute, King of Denmark. A great naval armament was assembled for the invasion; but the enterprise was abandoned, partly by reason of various mishaps, and partly, it is supposed, by reason of a skilful application of W.'s treasure. The tax called the *Danegelt* (q.v.) was reimposed to meet the expense caused by the threatened war. Disputes having arisen between W. and his son Robert respecting the duchy of Maine—which had come to W. through his marriage (1053, Nov. 2) with Matilda, daughter of Baldwin, 5th Earl of Flanders—father and son took



## WILLIAM II.

up arms against each other. The dispute was ultimately adjusted, through the intercession of Queen Matilda. Most of the latter part of W.'s life was spent in Normandy, the government of England being intrusted mainly to his half-brother Odo, Bp. of Bayeux. Insurrections, which broke out in his dominions on both sides of the Channel, were put down with prompt and sometimes merciless strokes of military force.—A disputed claim to the dist. of Vexin, on the e. frontier of Normandy, caused him to raise an army and invade France. He took the city of Mantes, and set it on fire; but his horse, stumbling on some hot embers, threw him, and the injury that he received proved fatal. Stern and ruthless as W. undoubtedly was, he yet knew how to govern a nation and protect it from foreign aggressions. For more than two centuries England had been harassed by the frequent descents of piratical hordes. This self-reliant ruler put an end to these: never after W.'s time did a Norse rover venture to show face on the English coast. He was as much statesman as warrior. He shrewdly centralized the governmental power (see DOMESDAY), holding in check the feudal barons; and diplomatically balancing his Norman and his Saxon subjects so that they acted as countervailing elements in his realm. In the common administration of justice, he was royally impartial; many of his severities are even referable in part to his thorough hatred of anarchy, while his attitude toward the church is admirable. He clearly defined the limits of ecclesiastical judicature, and when the formidable Pope Hildebrand desired that the conqueror should do homage to him for the kingdom of England, he boldly refused. He was an upholder of the Roman authority in the church, but would not brook its interference in his political sovereignty: he kept in his own hands the appointments to ecclesiastical dignities, and he would not allow papal excommunications to take effect in his kingdom without his leave.

WILLIAM II. (surnamed RUFUS), King of England: 1056–1100, Aug. 2 (reigned 1087–1100); b. Normandy; third son of William the Conqueror. He was educated by the celebrated Lanfranc, Abp. of Canterbury. He was the favorite son of his father, who, on his deathbed, recommended him to the barons and prelates as his successor to the crown of England. W., then with his father in Normandy, immediately set out for England. Landing at Dover, he obtained possession of its castle and of several other fortresses. He then presented himself to Lanfranc, who proposed him to the nobles and prelates as their king. No opposition was offered; and W. was crowned 1087, Sep. 26. Meanwhile, his elder brother, Robert, had entered on possession of the duchy of Normandy. The relative position of the brothers was such as, in those times, was sure to lead to war. Robert, at the instigation of his uncle Odo, Bp. of Bayeux, endeavored to excite an insurrection in England: the attempt failed, and W., in retaliation, invaded Normandy 1091, Jan. An arrangement having been ultimately made through the mediation of Philip I. of



## WILLIAM III.

France, Robert and W. then turned their united arms against their third brother, Henry, who had purchased from Robert the district of Cotentin, comprising nearly one-third of Normandy. The fortune of war went against Henry, who was driven into exile. Returning to England, W.'s next enterprise was an invasion of Scotland. The life of W. seems to have been a continual strife. Returning from Scotland, he saw cause to renew the contest with his brother, who had, meanwhile, strengthened himself by alliance with Philip of France. A pecuniary payment, however, by W. to Philip soon dissolved the bond. W. would now, doubtless, have taken signal vengeance on his brother, had he not been recalled to England by disturbances in Wales and in the north. In 1096 Robert, having resolved to go on crusade to Palestine, sold his duchy of Normandy to W., for £10,000. This transaction led to a contest between W. and a chieftain named Helie de la Flèche, who had all along disputed Robert's right to the Maine district of Normandy. Helie, unable to withstand the English monarch, who now took the field against him, disbanded his forces and fled. The last three years of William Rufus were occupied with these tedious conflicts in France. He was shot (it is said, accidentally, though there appears equal reason to believe the act intentional) by an arrow, supposed to have come from the bow of Sir Walter Tyrrel, while hunting in the New Forest. His body was buried in Winchester Cathedral. W. inherited the courage, energy, and political talent of his father; but he exercised an unscrupulous tyranny; as was shown in his expulsion of Anselm (q.v.), who had succeeded Lanfranc as abp. of Canterbury. See Freeman's *Reign of William Rufus* (2 vols. Oxford 1882).

WILLIAM III., King of England, and Prince of Orange: 1650, Nov. 14–1702, Mar. 8 (reigned 1689–1702); posthumous son of William II. of Orange, and Mary, eldest daughter of Charles I. of England. The alliance of his family with the Stuarts excited the suspicion of Oliver Cromwell, by whose influence the young prince and his descendants were declared to be excluded from the stadtholdership of the United Netherlands. W. 'found himself,' says Macaulay, 'when first his mind began to open, the chief of a great but depressed and disheartened party, and the heir to vast and indefinite pretensions, which excited the dread and aversion of the oligarchy, then supreme in the United Provinces.' The restoration of the Stuarts in England greatly improved his prospects; and on the murder of De Witt, W., then in his 22d year, was chosen stadtholder. The republic was at this time carrying on an apparently hopeless war with its powerful neighbor, Louis XIV. of France; but by the wisdom and determination of the young stadtholder, the contest, after nearly seven years, was terminated 1678 by the treaty of Nimeguen, in a manner highly advantageous and honorable for the United Provinces. A few years before, their ruin had seemed inevitable; but now the fame of W. became great over Europe. Shortly before this event, he

## WILLIAM III.

had married his cousin, Princess Mary, eldest daughter of the Duke of York, afterward James II. of England. This marriage, entered into solely from political considerations, did not at first prove happy. W. seems to have been doubtful of his wife's position, and too reserved to give utterance to his feelings. According to Macaulay, a complete explanation and reconciliation were ultimately procured by the agency of Bp. Burnet.

In 1686 W., as Prince of Orange, became the head of a league formed among the Prot. princes of Germany, the kings of Spain, Sweden, and others, having for its object to curb the power of Louis XIV. The treaty by which the alliance was constituted was signed at Augsburg 1686, July. In England, the tyranny of James II. (father of W.'s wife) was beginning to estrange from him the affections of every class of his subjects; and the eyes of all were turning toward the stadtholder as their only hope—he being the heir presumptive to the Eng. throne. Having formed his resolution, W. conducted his operations with great secrecy and skill. 1688, Nov. 5, he landed at Torbay, with 15,000 English and Dutch troops. His success was rapid and bloodless. Men of influence of all parties gave him their presence and support; and Dec. 18 he entered London triumphantly as a national deliverer. According to the decision of a convention of representative men of the kingdom, summoned by W., in London, William and Mary were proclaimed king and queen, 1689, Feb. 13. The adherents of James held out for some time in Scotland and Ireland; but the death of Dundee ended their resistance in Scotland; and in Ireland it was ended 1691, after a vigorous contest of two years, in which the Stuart party had, in most cases, the advantage.

The object of W., in accepting the crown of England, was probably not so much to free the English nation from the tyranny of James, as to enlist its power on his side against that of France. The first year of his reign was occupied in forming the coalition against Louis XIV. known as the Grand Alliance. In spite of his sterling qualities, and of the debt which they owed him, the English nation never really liked William III. The death of his wife (1695), on whom the crown had been conferred jointly with himself, materially injured his position. His schemes were thwarted by parliament, in which the whigs and tories quarrelled violently in spite of all his efforts to conciliate both parties; continual plots for his assassination were hatched by the adherents of James; and in his warfare with France, victory was almost always on the side of Louis, W. being in person repeatedly defeated by Luxembourg (q.v.); and it was not without a struggle and a pang that he agreed to the terms of the peace, eminently popular, however, which was concluded at Ryswick 1697, Sep. 10. The death of Charles II. of Spain 1700, and the succession of Philip of Anjou, was another blow to his policy. He carried it on, however, with unflagging vigor till his death, which was occasioned by a fall from his horse 1702. The massacre of the Mac-



## WILLIAM IV.

donalds of Glencoe (q.v.), and his conduct relative to the promoters of the Darien Scheme (q.v.), are two blots on W.'s reputation which his most thoroughgoing apologists have been unable to efface. However, he was undoubtedly a practical genius of the highest order, and the services which he rendered both to England and to his native country can hardly be overrated. During his reign the Bank of England had been founded, the modern system of finance introduced, ministerial responsibility recognized, the liberty of the press secured, and the British constitution established on a firm basis. In his domestic life, he committed the error of a too stern repression of all manifestation of kindly or genial feeling. His manner was wholly Dutch, and even his countrymen thought him blunt. 'In his intercourse with the world in general,' says Lord Macaulay, 'he appeared ignorant or negligent of those arts which double the value of a favor and take away the sting of a refusal.'—See Macaulay's *History of England*.

WILLIAM IV., King of Great Britain and Ireland: 1765, Aug. 21—1837, June 20 (reigned 1830–37); b. Windsor; third son of George III. Until 1771 he remained, with the Prince of Wales and Prince Frederick, under the care of Dr. Majendie. He was then sent to Kew, where, with Prince Edward, afterward Duke of Kent, he was under the guardianship of Col. Bude. 1779, June 15, he entered the navy as midshipman on the *Prince George*, under Rear-admiral Digby. The *Prince George* then joined Admiral Rodney's squadron, on its way to Gibraltar. After seeing considerable service, Prince W. was made a lieut. 1785, and received his commission as capt. the next year. In 1789 he was created Duke of Clarence and St. Andrews, and Earl of Munster, with an allowance from parliament of £12,000 a year. Subsequent to this, several acts of insubordination, on his part rendered an actual continuance of his professional career impossible; he was, however, formally promoted through the successive ranks until he was made admiral of the fleet 1801. Meanwhile he had been living almost entirely ashore, with Mrs. Jordan, a famous actress, with whom he had become connected 1791: by her he had a family of five sons and five daughters, who became known by the surname Fitzclarence, and were raised to titular dignities. 1818, July 11, he married Adelaide, eldest daughter of the Duke of Saxe-Meiningen. The issue of this marriage was two daughters, both of whom died in infancy. By the death of the Duke of York 1827, the Duke of Clarence became heir-presumptive to the throne; to which he succeeded on the death of his brother, George IV., 1830, June 28.

In the earlier part of his reign he showed mildly 'liberal' tendencies, which in his last years disappeared. He was of a well-meaning but somewhat irresolute disposition. The great event of his reign was the passing of the Reform Bill (see REFORM, BRITISH PARLIAMENTARY). The first Reformed parliament met 1833, Jan. 29. The abolition of colonial slavery, the reform of the poor-laws and of the



## WILLIAM—WILLIAM I.

Irish Church, were the immediate results of the great constitutional change. W. IV. dying, after a short illness, 1837, was succeeded by his niece Queen Victoria.—See his *Life* by Percy Fitzgerald (2 vols. 1884).

**WILLIAM THE LYON**, King of Scotland: reigned 1165–1214; d. 1214. He succeeded his brother, Malcolm IV. Why he obtained the title Lion is one of the mysteries of history: perhaps from having been the first king who used the lion as a heraldic achievement, afterward the chief feature in the arms of Scotland. Desiring the possession of the Northumbrian districts, and invading them, after the example of his ancestors, he fell into the hands of an English party 1174, July 13; and for security was conveyed to Normandy, and there he consented, as the price of his liberation, to perform that homage for his kingdom which the English kings had long in vain attempted to exact from the rulers of Scotland. The treaty of Falaise, however, as the transaction was termed, from the place where it was adjusted, was revoked 1189 by Richard I. of England, in consideration of a payment of 10,000 marks, which he wanted for his celebrated expedition to Palestine. W. had several disputes with the church; but he was one of the early benefactors of the regular ecclesiastics, and founded, 1178, the great abbey of Arbroath, which he dedicated to Thomas à Becket, who had been slain eight years earlier.—W.'s alliance with Louis VII. of France is the earliest authentic connection between the two countries—the first touch of a contact which lasted even to the 18th century.

**WILLIAM I. (WILHELM FRIEDRICH LUDWIG)**, German Emperor and King of Prussia: 1797, Mar. 22—1888, Mar. 9 (regent of Prussia 1858–61, king 1861–88, emperor 1871–88); b. Berlin; second son of Frederick-William III. of Prussia, and of Princess Louisa of Mecklenburg-Strelitz. He joined the army at an early age, and was engaged in the campaigns of 1813–4 against France. On the accession of his elder brother, Frederick-William IV. (q.v.), to the throne in 1840, W. became gov. of Pomerania, and afterward sat in the Prussian diet, and vigorously supported the absolutist party. In consequence, he was so much disliked by the people that in the revolution of 1848 he retired to England; though he returned some months afterward, and was elected to the national assembly. However, from this time he interfered little in the quarrels between the constitutionalists and absolutists, though he gladly accepted the command of the troops dispatched to put down the rising in Baden 1849; and in 1857 W.'s brother, the king, having become incapacitated for business, W. was commissioned to act as regent—a commission renewed from time to time till his permanent installation 1858, Oct. At this time he was very popular in Prussia, owing to his supposed opposition to some obnoxious measures of the king's ministers, and to his vigorous advocacy of joint action with Britain and France in the war of 1854; and his election as regent was consequently opposed by the aristocratic and pietistic parties, who were, on his elevation,

## WILLIAM I.

dismissed from power, and a more liberal ministry formed. 1861, Jan. 2, W. succeeded to the throne; and at his coronation at Königsberg Oct. 18, he himself put the crown on his head, declaring that he 'ruled by the favor of God, and of no one else.' The elections to the chamber of deputies at that time resulted largely in favor of the liberal party. W., astonished that the party whom he regarded as the opponents of the crown should have a majority, attributed it to the intrigues of secret enemies; and in his address at the opening of the chambers, saying that he 'never could permit the progressive development of our inner political life to question or to endanger the rights of the crown and the power of Prussia,' disclosed the principle of his policy—a policy which, with all the unconquerable persistence which characterizes men, like him, of thorough honesty, unflinching firmness, and no great breadth of mind, he afterward unremittingly pursued. The first chamber which sat after his coronation was dissolved, despite the protest of a large majority of the members; but the succeeding elections further increased the liberal majority; and though some popular measures were brought forward, and some obnoxious taxes abolished, the new chamber proved as refractory as its predecessor, and refused its consent to the extensive changes in the Prussian military system (the king's pet scheme), and to the raising of money by loan for that and other ministerial projects, till its constitutional powers were fully acknowledged. 1862, Sep. 22, Herr von Bismarck-Schoenhausen (see BISMARCK-SCHOENHAUSEN) was made prime minister; and the deputies having not only rejected the ministerial budget, but resolved that the expenditure of moneys not sanctioned by them was a breach of the constitution, the chamber was dissolved Oct. 14, the king declaring, by message, that as the three estates could not agree, he should continue to do his duty to his people, without regard to 'these pieces of paper called constitutions,' in which he had no faith. The number of the liberals was further increased in the following year, and the contest continued; the deputies exercising the same firmness and extreme moderation as before; while the king and his ministers made it plainly understood, that if the lower chamber did what the government asked, all would be well; but if not, the king would 'do his duty' without its aid. However, this strife between the old feudal and the modern liberal doctrines was shelved at the close of 1863, by the able strategy of Bismarck, who revived the old dispute with Denmark regarding its government of Slesvig and Holstein; and by forcing Austria to joint action, contrived to make the question one of 'German' interest: see SLESVIG. BISMARCK-SCHOENHAUSEN. From this time the nation was united in sympathy with him—convinced that his aims were honest and that his general policy for Germany was wise. Then came the war (see GERMANY—*North German Confederation*) between Prussia and Austria. W. became the head of the N. German Confederation 1867: a federal constitution and council were established, and a parliament elective by



## WILLIAM II.

popular suffrage; and Bismarck was made chancellor, and pres. of the council. At Ems, 1870, July, took place the memorable interviews between W. and the French ambassador Benedetti, which ended in the war of 1870-1, declared by France: see FRANCO-GERMAN WAR. W. accompanied the army, and commanded at the decisive battles of Gravelotte and of Sedan. 1871, Jan. 18, W. was proclaimed emperor of Germany in the palace of the French kings at Versailles. Soon thereafter (1872) the ancient enmity between pope and emperor was revived by the education measures of the German government: see GERMANY—*German History*. W. was made arbiter between Great Britain and the United States on the San Juan boundary question 1871, deciding in favor of the United States: see SAN JUAN ISLAND. 1878, May, the emperor was twice shot at, being seriously wounded the second time: these attempts were attributed, directly or indirectly, to socialist influence, and led to legislation for repressing socialism.—W. married, 1829, June 11, Princess Maria Louisa Catherine Augusta (see AUGUSTA) of Saxe-Weimar; by whom he had issue Frederick-William, crown-prince, afterward FREDERICK I., German emperor (q.v.), who succeeded W. 1888; and Louisa Mary, who married 1856 Frederick William, Grand Duke of Baden.

WILLIAM II. (FRIEDRICH WILHELM VICTOR ALBRECHT), third German Emperor, and King of Prussia: b. 1859, Jan. 27; son of Frederick I. (German emperor and king of Prussia), and of Victoria Adelaide (princess royal of Great Britain). He succeeded to the throne on the death of his father 1888, June 15. He had been known as Prince William; was educated in the gymnasium of Cassel and the Univ. of Bonn, where he studied political science, jurisprudence, and mathematics; and 1882 was placed with Dr. Achenbach to learn the details of the civil service. At this time he was instructed also by Bismarck, whom he visited once a fortnight. He married, 1881, Princess Augusta Victoria of Schleswig-Holstein-Augustenburg; and has six sons, the eldest, the Crown Prince Friedrich Wilhelm Victor August Ernst, b. 1882, May 6. From his strong military tastes, it was thought that W. would be prone to war, on coming into power; but he professes both a policy and an expectation of peace. He was reported to have a great antipathy to everything English, and even, on his accession, to have failed in due consideration for his mother, Victoria Adelaide (daughter of Queen Victoria); but 1889, Aug., he visited the queen at Osborne, was present at army and navy reviews, and was named honorary adm. of the British navy. He has received and returned the usual visits of reigning sovereigns; and visited Athens to attend the marriage of his sister, Princess Sophie, to the crown prince of Greece, going thence to Constantinople. He has favored measures for relief of labor, and later sought to restrict free discussion. Notable was his removal, 1890, of Bismarck (q.v.) from power. He is characterized by a restless activity of mind, and by high claims for monarchical prerogative.



## WILLIAM II.—WILLIAM III.

**WILLIAM II.** (FREDERIK GEORGE LOUIS WILLEM), King of the Netherlands: 1792, Dec. 6—1849, Mar. 17 (reigned 1840–49); b. at the Hague; son and successor of William I. W., the Prince of Orange, studied at Berlin and Oxford; and 1811, joining the army in Portugal, he served on the staff of Lord Wellington, to whom he became adjutant, and speedily obtained the rank of colonel. His bravery was conspicuous in many battles of the Peninsular campaign, also at Quatre Bras, and Waterloo, where he was wounded. He married, 1816, Anna Paulowna, youngest sister of Emperor Alexander I. of Russia. Later he was in command of the army of the Netherlands. Having more liberal views than were then common, the prince took little share in state affairs. On the abdication of his father, William I. (see NETHERLANDS), the Prince of Orange ascended the throne (1840) as William II. The political movements of 1848 were felt in the Netherlands, as in other countries; and the ministerial plans of reform not having satisfied the party of progress, the king announced his willingness to sanction whatever changes in the constitution were thought necessary, and the storm was averted. The new constitution was proclaimed 1848. W.'s death 1849 was universally regretted. He was marshal in the Brit. army, and held a multitude of European orders.—See *Het Leven van Willem II.*, door J. J. Abbink; also the same by Bosscha.

**WILLIAM III.** (ALEXANDER PAUL FREDERIK LOUIS WILLEM), King of the Netherlands, and Grand Duke of Luxemburg; 1817, Feb. 19—1890, Nov. 23 (reigned 1849–90); b. at the Hague; son and successor of William II. In his reign the kingdom had uninterrupted peace, material prosperity increased, and the public debt was considerably reduced. W.'s reign was notable for undertakings which contribute to national greatness. The drainage of the Haarlem Lake (q.v.) was completed 1852, removing an ever-enlarging enemy, and adding nearly 50,000 acres to the wealth-producing power of the country. In 1863 the slaves in the Dutch W. Indian colonies were emancipated, under wise restrictions. Railways were extensively constructed; the water-way to Rotterdam was improved; and the Isthmus of Holland was cut by a canal, continued through the Ij. Parliamentary institutions were greatly developed. In 1866 Luxemburg and Limburg were withdrawn from the German Confederation, the latter being incorporated with the Netherlands. By W.'s first wife, a Würtemberg princess, he had two sons, the last survivor of whom was Alexander, Prince of Orange (1851–84); his second wife, Princess Emma of Waldeck-Pyrmont, bore him a daughter, Wilhelmina, 1880, who succeeded him on the throne of the Netherlands 1890, under the regency of her mother.

## WILLIAM.

WILLIAM, Prince of Orange, and Count of Nassau, (surnamed THE SILENT): founder of the independence of the Netherlands; 1533, Apr. 16—1584, July 10 (ruled his inherited estates 1544-84); b. Dillenburg; son of William of Orange. His father, William, was second son of Count John of Nassau-Dillenburg, and succeeded to the German possessions of the family; while his elder brother (W.'s uncle), Henry, obtained the extensive estates in Luxemburg, Brabant, Flanders, and Holland. The latter also, by his marriage with Claudie of Chalons, added the charming little principality of Orange to his extensive domains; but his son René dying without issue, left Orange with the Low Countries' estates to his cousin, W., 1544. W. had hitherto lived at Dillenburg under the care of his father, who was a zealous Lutheran; but on his becoming the most powerful lord of the Low Countries, he was sent to the queen regent's court at Brussels, and brought up in the Rom. Cath. faith. At the age of 15 he became page to Emperor Charles V., who exercised almost paternal care of him, attentively watched his development, and took him into his inmost confidence, making him the depositary of important secrets, employing him in diplomatic offices, and, 1555, promoting him, over the heads of all his veteran officers, to command the imperial army on the French frontier. In all these situations, W. showed acute intelligence, sound judgment, and a precocious knowledge of men; while bearing himself with a grace and dignity of manner that gained universal esteem. Charles, on his abdication, strongly recommended W. to his son Philip as a confidential adviser; accordingly, we find him employed to draw up the treaty of Cateau-Cambresis, and selected as one of the four hostages to be given to France for its fulfilment. During W.'s residence in France, he was confidentially informed by Henry II. of a secret arrangement then being formed between France and Spain for the complete extermination of heretics in both countries; and with admirable nerve, dissembling his horror of the project, he resolved to oppose the execution of the scheme in the Netherlands to the uttermost of his power. This was the occasion of his being named 'the Silent;' though his disposition in general was remarkably frank and open. Returning to the Low Countries, he became the leader of the party devoted to maintaining the chartered liberties of the country; he agitated for recall of the Spanish troops, opposed the augmentation of the number of bishoprics (a pet scheme of Philip's, and finally broke entirely with Cardinal Granvelle, president of the council, and the willing agent of Philip's tyranny. Expostulations to the regent Margaret of Parma, and directly to Philip himself, far from producing any good result, seemed only to hurry the bigoted monarch to extreme measures; the cruel edicts against heretics were made still more stringent, and at the end of 1564 the Inquisition was established. W., however, steadily refused to allow these oppressive enactments to take effect in his hereditary governments of Holland and Zeeland and though he did not join in the fa-



mous protest known as the 'Compromise' which was presented to the regent by the 'Beggars,' he supported their proposals at court, seeing that, though maintained with somewhat too much violence, their general aims were the same as his own. For the next few years he was unremitting in his exertions to impress both the rulers and the people with the desirableness of moderation, and on several occasions succeeded by his personal influence in repressing religious dissension. Hitherto he had labored conjointly with Counts Hoorn and Egmont; but failing to convince his two associates of the rank duplicity of the king, of which he himself was assured through the spies in his pay at the Spanish court, and of his perfidious designs against them, he was compelled to leave them to their fate, and retired to his German estates. Hoorn and Egmont were seized and put to death; W., cited as a rebel (1568, Jan.), and, on the ground of being a knight of the Golden Fleece and a sovereign prince, refusing to appear, had his estates confiscated; and the Duke of Alva arrived at Brussels, to reduce the provinces to submission. W. had hitherto lived in luxury and extravagance, the splendor of his household far exceeding that of his royal master; but now he effected a thorough retrenchment, and disposed of his valuables, to equip four armies for invasion of the Low Countries. Two of the armies failed completely; the third, under his chivalrous brother Louis, was destroyed at Jemmingen by Alva; and the fourth, 30,000 strong, under his own immediate command, lay in Brabant, unable to force Alva's army to a conflict, till lack of the means of paying his soldiers forced him to retreat. His next attempt was made 1572, and, though as unsuccessful on land as before, he succeeded in exciting Holland, Zeeland, Gelders, Overysse, and the bishopric of Utrecht, to rise for their liberties; and was proclaimed by these provinces as their stadtholder for the king, whose authority he and they still acknowledged. Meantime, his coadjutors, the 'Beggars of the Sea,' had taken Brill and Flushing, and had committed heavy depredations on Spanish commerce. But ere long the fortune of the Spaniards on land was again in the ascendant; fortress after fortress fell into their hands, despite W.'s utmost efforts to relieve them; and though Holland and Zeeland still remained faithful to the cause of liberty, he found it impossible to raise an army which could fairly cope with the enemy. He succeeded, however, by breaking the dikes and flooding the country, in saving Leyden; though Antwerp and Haarlem experienced all the horrors of a siege and capture. At this period W. openly professed himself a Calvinist, though, with his usual moderation, he utterly disclaimed the bigoted fanaticism which characterized his co-religionists, and in which they rivalled their Rom. Cath. adversaries. Success still attended the patriot fleet; and though the gallant Louis, with his brother Henry, was defeated and slain at Mocker-Heide (1574), the ruinous condition of the Spanish finances, and the general detestation in which the soldiers of Philip were justly held, helped W. to hold



## WILLIAM—WILLIAM AND MARY COLLEGE.

his ground. In 1575, Mar., conferences were opened at Breda between the belligerents; but Philip obstinately refusing to yield an iota, they were broken off; and in Oct. the provinces of Holland and Zeeland pronounced Philip's deposition, and gave power to W. to choose the country under whose protectorate they were to be placed. Meantime the rapacity of the Spanish soldiery had roused the 15 provinces which still remained loyal to Philip, and the league known as the *Pacification of Ghent*, 1576, Oct., whose object was to drive out the foreign troops, and establish, at least for a time, toleration in religion, was the consequence. This was a brilliant success for W.; and though Don John of Austria, the new governor, tried to dissolve it by the 'Perpetual Edict' (1577, Feb. 12), in which he granted nearly all demands, W. succeeded by skilful policy in foiling the attempt. War was accordingly resumed, and the patriots were defeated at Gembloux (1578, Jan. 31), though their spirits were afterward buoyed up by an occasional success. The next governor, Alexander Farnese, succeeded, however, in detaching the Walloon provinces from the league, though, to compensate for this, W. obtained the signature of the *Union of Utrecht* (1579, Jan. 23), the first foundation of the Dutch Republic. In the following year, his two faithful provinces, Holland and Zeeland, after having been nominally under the sway of Archduke Matthias of Austria, and of the Duke of Anjou, proclaimed W. their sole ruler, the Duke of Anjou being still acknowledged as sovereign of the others. W., however, after his long and desperate struggle for his country's freedom, did not long enjoy the honors of sovereignty, for, 1580, Mar. 15, Philip had, by Granvelle's advice, put a price of 25,000 gold crowns on his head; and the incitement of this immense bribe produced various attempts to assassinate him, the last of which, by Balthasar Gerard, was successful at Delft, 1584. W. was four times married; and left by his first wife (Anne of Egmont) Philip-William, Prince of Orange; by his second (Anne of Saxony) the famous Maurice (q.v.); and by his fourth (Louise de Coligny) Frederick-Henry, who succeeded Maurice as stadtholder of Holland.

WILLIAM OF MALMESBURY: see MALMESBURY, WILLIAM OF.

WILLIAM OF OCCAM: see OCCAM, WILLIAM OF.

WILLIAM OF WYKEHAM: see WYKEHAM, WILLIAM DE.

WILLIAM THE SILENT: see WILLIAM, Prince of Orange, and Count of Nassau.

WILLIAM AND MARY COLLEGE: oldest college, next to Harvard, in the United States; at Williamsburg, Va., and named at its foundation (1693) from the reigning king and queen of England, William III. and Mary, who devoted lands, funds, and a duty on tobacco to its endowment and maintenance. Sir Christopher Wren planned its buildings, of which the first was burned 1705, and rebuilt. Before the revolution, the endowment, together with public and private gifts, and a part of the income of a fund

## WILLIAMS.

left by the philosopher Robert Boyle (and devoted to Indian students), gave this institution larger resources than those of any other in the colonies. The revolutionary war reduced it to poverty, but it was revived afterward, with less of a theological and missionary and more of a scientific and university cast. In 1859 it again was ravaged by fire and was reduced by the expense of rebuilding; and it was suspended in the civil war and the buildings partly burned. The main edifice was restored, and college reopened 1869.

The institution has at times had chancellorships, at first the bishops of London; subsequently, at intervals, George Washington, John Tyler, and others. It claims to have been the first in the United States to introduce lecturing—viz., in nat. philos. by Dr. Small 1758; the first in America to establish a chair of municipal law, 1779, and the first, the same year, to announce an elective system of study; the first to introduce a univ. system and assume the title, 1782; and the first to found a professorship of hist. and polit. science, 1822. Its long roll of graduates records the names of Jefferson, Monroe, Tyler, the first Peyton Randolph, Judge Marshall, Gen. Scott, and other distinguished men. Since 1888 the pres. of the college is the Hon. Lyon Gardiner Tyler, son of Pres. John Tyler by his second wife, and author of the Tyler biographies, and of *Parties and Patronage in the United States* (1891). In 1888 the Va. general assembly passed an act to appropriate annually the sum of \$10,000 for a normal school of three years in connection with the institution. The courses of study in other depts. are junior and senior in moral science, polit. econ., and civil govt.; junior, intermediate, and senior I. and II. in English and hist.; the same in mathematics and in languages; and the same, with but one year senior, in nat. science. The usual degrees are conferred. There are a few scholarships and prizes. The library (former valuable collections having been destroyed) numbers about 10,000 vols. There is a prosperous Young Men's Christian Assoc., and the usual morning religious service; but the college is undenominational, the ministers of the several local churches officiating in turn. Whole number of students (1897) 128.

**WILLIAMS, wil'yamz, ALPHEUS STARKEY:** soldier: 1810, Sep. 10—1878, Dec. 21; b. Saybrook, Conn. He graduated at Yale 1831, and studied law. After travelling in Europe, he began the practice of law in Detroit 1836; was judge of probate of Wayne co., Mich., 1840-44; and became proprietor of the Detroit *Daily Advertiser*, and its editor 1843-48. He served as lieut.col. in the Mexican war, and on the breaking out of the civil war commanded a division in the Shenandoah valley, with rank of brig.gen. of vols. He was in the battles of South Mountain, Antietam, and Gettysburg; was transferred to Tenn.; and commanded the 20th corps in Sherman's march to the sea, and in the subsequent Carolina campaign. He was promoted brevet maj.gen. vols. 1865, and mustered out of service 1866; was minister to San Salvador 1866-69, and representative in congress 1874-78. He died at Washington.



## WILLIAMS.

WILLIAMS, BENJAMIN: 1754-1814; b. N. C. He served in the revolutionary army, and was promoted col. for service at Guilford. He served in the legislature; was member of congress 1793-95; gov. of N. C. 1799-1802 and 1807-8; and member of the state senate 1808-9. He died in Moore co., N. C.

WILLIAMS, ELEAZER: about 1787-1858, Aug. 28; b. Caughnawaga, N. Y.; reputed great-grandson of Eunice, daughter of John W. (1644-1729) (q.v.). He was educated at Long Meadow and Westhampton, Mass. In the war of 1812 he was supt.gen. of the northern Indian dept., and was severely wounded at the battle of Plattsburg. He was ordained in the Prot. Episc. Church, and worked among the Oneida Indians, removing with them to Green Bay, Wis. In 1853, Feb., an article by Dr. Hanson, entitled *Have We a Bourbon among Us?* was published in *Putnam's Magazine*, setting forth W.'s apparently sincere claim to be the lost dauphin of France, son of Louis XVI. and Marie Antoinette; and in 1854 Dr. Hanson published *The Lost Prince*, attempting to show W.'s identity with the dauphin. The claim has not been generally regarded as established. W. was interested in genealogical studies, and was an authority on Indian subjects. He published: *A Spelling-book in the Language of the Seven Iroquois Nations* (1813); *A Caution against our Common Enemy*, in Iroquois (1813); *Life of Te-ho-ra-gwa-ne-gen, alias Thomas Williams* (1859); and Iroquois transl. of *The Book of Common Prayer* (1853).

WILLIAMS, ELIPHALET SCOTT: Baptist minister: 1757, Oct. 7-1845, Feb. 3; b. East Hartford, Conn.; descendant of John W. (1644-1729) (q.v.). He graduated at Yale 1775; joined the revolutionary army, and took part in the battles at Princeton and Trenton; and later enlisted in the navy, and was in the engagement between the *Hancock* and the *Levant*. He was employed in farming and teaching in Maine; was ordained to the ministry 1799; Bapt. pastor at Beverly, Mass., 1803-12, resigning to become minister at large, with residence at Boston. He died at Beverly.

WILLIAMS, ELISHA: Congregational minister: 1694, Aug. 24-1755, July 24; b. Hatfield, Mass. He graduated at Harvard 1711; studied law, and settled at Wethersfield, Conn., which he represented in the state general assembly; taught at Wethersfield; was ordained to the ministry 1721; Congl. pastor at Wethersfield 1721-26; pres. of Yale College 1726-39; and subsequently representative in the legislature and justice of the superior court. He was chaplain of the Conn. troops in Cape Breton 1745; and 1746 appointed col. of a regt. raised for a proposed expedition to Canada. He failed in a mission to England 1749 to secure the wages of his troops.



## WILLIAMS.

**WILLIAMS, EPHRAIM:** soldier: 1715, Feb. 24—1755, Sep. 8; b. Newtown, Mass. In early life he crossed the ocean several times as a sailor. In the war with France 1740-48, he served in Canada. The state of Mass. granted him 200 acres of land in 1750 in the present towns of Adams and Williamstown, where 1751 he erected Fort Massachusetts, and was made commander of the frontier-posts w. of the Connecticut river. In 1755 he marched with a regt. to join Sir William Johnson; fell into an ambuscade near Lake George, and was killed at the first fire. At Albany, while on the march, he made a will, leaving the greater part of his property to found a free school at Williamstown, which afterward became Williams College (q.v.). The students of the college erected 1854 a bowlder monument on the spot where he fell.

**WILLIAMS, GEORGE WASHINGTON:** author: 1849, Oct. 16—1892; b. Bedford Springs, Penn.; of mixed negro and white parentage. He was in military service in the civil war, and afterward in the Mexican republican army. After attending school near Boston, he preached in that city; did editorial work; took a course in the Cincinnati Law College; and was in the Ohio legislature 1879-81. For two years he was judge-advocate-gen. in the grand army, and was U. S. minister to Hayti 1885-6. He was editor of the *Southwestern Review* at Cincinnati, and *The Commoner* at Washington; and wrote a *Hist. of the Negro Race in America* (1883); *Hist. of the Negro Troops in the War of the Rebellion* (1887); and *Hist. of the Reconstruction of the Insurgent States* (1889). He died in Liverpool, England.

**WILLIAMS, JAMES:** soldier in the revolution: 1740-1780, Oct. 8; b. Hanover co., Va. He lived for a time in Granville co., N. C., whence he removed to Little River, S. C. He was a member of the S. C. provincial assembly 1775; was appointed lieut.col. of state forces 1776; participated in the battle of Stono, and gained a victory at Musgrove's Mills, 1780, Aug. He was killed while leading one of the attacking columns in the battle of King's Mountain.

**WILLIAMS, JESSE LYNCH:** civil engineer: 1807, May 6—1886, Oct. 9; b. Westfield, N. C.; of a family belonging to the Society of Friends, and subsequently removing to O. and to Ind. Beginning as rodman, he became an engineer of western canals; 1837 chief engineer of the state of Ind.; 1853 chief on the Pittsburgh Fort Wayne and Chicago line; in 1864-69 govt. director of the Union Pacific, locating a part of the line; and 1869-71 receiver of the Grand Rapids and Indiana road. He was prominent in assemblies of the Presb. Church, and a director of its seminary in Chicago. He died in Fort Wayne, Ind.

**WILLIAMS, JOHN:** Congregational minister: 1644, Dec. 10—1729, June 12; b. Roxbury, Mass. He graduated at Harvard 1683, and was pastor in Deerfield, Mass., 1688 until his death. In 1704 a force of French and Indians surprised the town; killed a number of the people, including two of W.'s children; and led him, his remaining family, and (it is said) 300 other captives to Canada, Mrs. W. be-

## WILLIAMS.

ing killed by the savages on the way, when she had fallen from exhaustion. W. was redeemed from his captivity, and resumed his charge at Deerfield. He wrote a narrative of the events, *The Redeemed Captive* (1707), and a memoir of him was published by Stephen W. W., 1837.—His daughter EUNICE W., b. 1696, was aged 8 when carried into the captivity, and her release was sought in vain. As she grew up, she became a Rom. Catholic; married an Indian, John de Rogers; and, though she visited her relatives, refused to give up her Indian ways, or to accept a bounty of land offered by Mass. to induce her to return. She was the reputed great-grandmother of the Rev. Eleazer Williams (q.v.), afterward in discussion as the abducted son of Louis XVI. of France.

WILLIAMS, JOHN: Christian missionary: 1796, June 29—1839, Nov. 20; b. Tottenham, London. At the age of 14 he was apprenticed to an ironmonger, and during his apprenticeship acquired a knowledge of mechanic arts, which he afterward turned to great account. Having become deeply religious, he offered himself to the London Missionary Soc. (a soc. directed largely by Eng. Congregationalists) as a missionary to the South Seas. He was ordained 1816, and sent to Eimeo, one of the Society Islands. Two months after his arrival, he was able to preach to the people in their native tongue. From Eimeo he soon went to Huabeine, and afterward to Raiatea, the largest of the Society group. His labors here were attended with great success; the island became Christian, and the arts and habits of civilization were introduced with Christianity. Wherever W. went, he not only preached the gospel, but instructed the people in the arts, so as to elevate them from their barbarism. At Raiatea he heard of Raratonga, the chief of the Hervey Islands, and thither he went 1823. The mission which he founded there was eminently successful; not only Raratonga but the whole group of the Hervey Islands being soon Christianized. In his missionary work, W. made great use of native teachers, trained by himself. He translated the New Test. into the Raratongan language, and prepared books for the schools which he established. After spending some time in Raratonga, he wished to return to Raiatea; but the island in which he lived lay out of the way of vessels, and he resolved to build one. He made all the necessary tools, and in about 15 weeks, with the help of natives whom he trained to the work, he completed the vessel, 60 ft. long, 18 wide, the sails of native matting, the cordage of the bark of the *Hibiscus*, the oakum of cocoa-nut husks and banana stumps. In this vessel, during the next four years, he visited many of the South Sea Islands, extending his missionary labors to the Samoa Islands. In 1834 he went to England, where he remained nearly four years, during which he procured the publication of his Raratongan New Test. by the Bible Soc., and raised £4,000 for the purchase and outfit of a missionary-ship for Polynesia. In 1838 he returned to his chosen sphere of labor, visited many of the islands, and finally the new Hebrides where



## WILLIAMS.

he hoped to plant a mission, but was killed by the savage natives of Erromanga, on whose unknown shores he had landed. His death was the occasion of great lamentation in the islands which owed to him their Christianization and civilization. W. was remarkably successful as a missionary, not only by his own preaching, but through the instrumentality of natives whom he trained. He possessed in an extraordinary degree the power of organizing. His mechanical skill and genius also were of great service; and probably no other missionary has ever been so successful in making the progress of civilization attend on the progress of Christianity.—See *Memoir* by Ebenezer Prout (London 1843).

WILLIAMS, JOHN, D.D. LL.D.: Protestant Episc. bishop: b. Deerfield, Mass., 1817, Aug. 30. After two years at Harvard, he graduated at Trinity Coll., Hartford, 1835, where he was tutor 1837-40. Meanwhile, having studied theol. with Prof. Jarvis, he was ordained 1838. He was asst. minister in Middletown, Conn.; rector in Schenectady, N. Y.; and 1848 became pres. of Trinity Coll., and prof. of hist. and literature. Two years before resigning this office, he was elected asst. bp. of Conn., 1851; and succeeded as sole bp. 1865. As a result of his extra labors in teaching theol. students, while prof., the Berkeley Divinity School was founded at Middletown, Conn., 1854, of which he became dean, and chief instructor in theol. and other studies. He lectured on hist. at Trinity College, and 1881 gave the Paddock lectures in the General Theol. Seminary, New York, and the Bedell course at the Gambier Institution, O. He has been chairman of the house of bishops, and presiding bp. of the church. In all his positions he has shown ability and learning, sound judgment and Christian earnestness, with eloquence as a speaker. To the church weeklies and reviews he has been a frequent contributor; and he has published many discourses and addresses, including one on *Everlasting Punishment* (1865); also, in book form, *Ancient Hymns of the Holy Church* (1845); *Thoughts on the Gospel Miracles* (1848); *The English Reformation* (1881); *The World's Witness to Jesus Christ* (1882); *The Seabury Centenary* (1885); and *Studies in the Book of Acts* (1888).

WILLIAMS, JOHN FOSTER: naval officer in the revolution: 1743, Oct. 12—1814, June 24; b. Boston. Trained to a seafaring life, he had command of a cruiser, the *Hazard*, and in 1779 captured the Brit. vessel *Active*, with a superior armament. The next year, in command of the *Protector*, he encountered and blew up the privateer *Admiral Duff*. Among his many daring adventures, he attacked the frigate *Thames*, but made good his escape from his far too powerful antagonist. He took many prizes on the northern coast, also in the W. Indies, where at last he was forced to surrender when at disadvantage, and was held prisoner until the end of the war, after which he was in the revenue service. He died in Boston.



## WILLIAMS.

**WILLIAMS, JOHN JOSEPH, D.D.** : Roman Cath. archbishop: b. Boston, 1822, Apr. 27. His education, begun in Boston, was completed in the College of Montreal 1841, after which he studied theol. and was ordained in Paris 1845. Assistant in the cathedral at Boston, he became its rector 1855, and pastor of St. James's 1857. He was made asst. bp. of Boston 1866, and succeeded to the bishopric the same year. After the institution of the dioceses of Springfield and Providence, he was made abp., the new province including also the sees of Portland and Burlington. He has been active in establishing church institutions, among them the Sulpitian Theol. Seminary. The archiepiscopal province of Boston now includes the additional sees of Manchester, N. H., and Hartford, Conn.

**WILLIAMS, JONATHAN**: soldier: 1750, May 26—1815, May 16; b. Boston. In youth he was engaged in mercantile pursuits in his native city, and on voyages. His grand-uncle, Benjamin Franklin, employed him as bearer of dispatches, and as sec. to the embassy in Paris. From 1785 he was judge of the court of common pleas in Philadelphia, until 1801, when he was commissioned maj. in the artillery and engineer service of the U. S. army, having studied the science of these branches while in France. He was stationed at West Point, where he became first supt. of the Milit. Acad., founded 1802, resigning 1803, but resuming 1805, with rank of lieut.col. and chief engineer. He designed and built the inner defenses of New York harbor; Castle Williams was named after him; but he resigned from the army when the command of this fort was refused to him at the beginning of the war of 1812. He is honored as 'the father of the corps of engineers.' He died in Philadelphia, where he was a prominent officer of the Amer. Philos. Soc., to which he contributed papers. He published translations of works on fortification and on maneuvers for horse artillery. His recommendation to congress included the full West Point system of instruction, afterward adopted.

**WILLIAMS, Sir MONIER MONIER**, D C.L., LL.D.: Sanskrit scholar and Indologist: b. Bombay, 1819; son of Col. Monier W., surveyor-gen. of the Bombay presidency. He was educated at King's Coll., London, Oxford Univ., and the E. India Coll., Haileybury, at which last he was prof. of Sanskrit 1844-58; and, after superintending oriental studies at Cheltenham two years, became Boden prof. of Sanskrit at Oxford 1860. In 1875 and 6 he twice visited India to make researches and to secure co-operation in establishing an Indian institute at Oxford; and at its opening 1886 he was knighted. He has received many honors as a scholar, and from the highest sources. Besides many text-books in Sanskrit, and translations from it, he has published: *Indian Epic Poetry* (1863); *Indian Wisdom* (1875); *Modern India and the Indians* (1878); *Religious Thought and Life in India* (1883); *The Holy Bible and the Sacred Books of the East* (1887); *Buddhism in its Connection with Brahmanism and Hinduism, and in its Contrast with Christianity* (1888).

## WILLIAMS.

**WILLIAMS, NELSON GROSVENOR:** soldier: b. Bainbridge, N. Y., 1823, May 4. After an academy education at Utica, he spent one year at West Point Milit. Acad.; entered the army as col. of the 3d Io. vols. at the outbreak of the civil war; served in Mo. till 1862, Mar.; commanded a division at the battle of Shiloh; and took part in the siege of Corinth. He was promoted brig.gen. 1862, Nov., but soon resigned on account of injuries received at Shiloh. He received an appointment in the U. S. custom service, New York, 1869.

**WILLIAMS, OTHO HOLLAND:** revolutionary soldier: 1749, Mar.—1794, July 16; b. Prince George co., Md.; descended from some of the earliest settlers of Md. He was left an orphan when 12 years old. At the beginning of the revolutionary war he was appointed lieut. of a rifle corps; marched to Boston, where he was promoted capt. 1776; taken prisoner at Fort Washington, and released on parole but, for fear that he would open a correspondence with Washington, was reapprehended and kept in confinement for 15 months. He was appointed col. of the 6th Md. regt.; adjt.gen. of the southern army 1780–83; did good service at the battle of Camden; commanded the rear-guard in Greene's retreat; took part at Guilford and Hobkirk Hill; decided the day at Eutaw Springs; and was sent with dispatches to congress, which promoted him brig.gen. 1782. After the war he settled at Baltimore, and was collector of the port 1783–94. He published *Narrative of the Campaigns of 1780*. See sketch of his life, by Osmond Tiffany (1851).

**WILLIAMS, ROGER:** founder of the state of Rhode Island: about 1600–83; b. of Cornish parents [another account gives, about 1606–83; b. Wales]. In his youth he went to London, and attracted the attention of Sir Edward Coke by his shorthand notes of sermons, and of speeches in the Star Chamber; and was sent by him to Sutton's Hospital, now the Charterhouse School, 1621. W. matriculated probably at Pembroke College, Cambridge, 1625, taking his degree 1627 [another account says that he entered Jesus College, Oxford, 1624]. He studied Latin, Greek, Hebrew, French, and Dutch, and was ordained a clergyman of the Church of England, but soon became an extreme Puritan, and emigrated to New England, arriving at Boston 1631, Feb. 5, 'a young minister, godly and zealous, with his wife Mary.' He refused to join the congregation at Boston, because the people would not make public declaration of their repentance for having lived in communion with the Church of England, nor declare themselves fully separated therefrom; he therefore went to Salem, as assistant pastor; but was soon in trouble for denying the right of magistrates to punish Sabbath-breaking and similar religious offenses. For such opposition to the theocracy of those times, he was compelled to leave Salem, and took refuge with the more tolerant colony at Plymouth, where he studied Indian dialects and was assistant pastor (1631, Aug.). Two years later he returned to Salem, and 1634 was settled as pastor there. But he



met renewed persecution and banishment from the Mass. colony, for denying the validity of the Mass. charter granted by Charles I. 1629, since, as he said, the king of England had no right thus to give away the land that belonged to the Indians. He denied also the right of a government to impose faith and worship; holding that it was not lawful to require a wicked person to take a judicial oath or to pray, which both were forms of worship; and that the power of the civil magistrate extends only to the bodies, goods, and outward state of men, and not to their souls and consciences. Banished from the colony 1635, and threatened with being sent back to England, he escaped through the wilderness to the wigwams of the Pokanokets, whose chief, Massasoit, granted him and his few adherents land on Seekonk river. But 1636, June, to avoid possible complications with the Plymouth colony, W. with five others embarked in a canoe for Rhode Island, and at the head of Narragansett Bay founded the city which he piously named Providence. On this tract, granted by the powerful Narragansett chiefs Canonicus and Miantonomoh, W. established a government of pure democracy and of full religious toleration. Having adopted the belief in the baptism of only adult believers, and by immersion, W. was so baptized by a layman, and then baptized him and ten others, thus founding the first Bapt. church in America (1639). About four months afterward, W. doubted the apostolic validity of this baptism, and withdrew from the church that he had founded. In 1642 he went to England to procure a charter for his colony, and published a *Key to the Languages of America*; also *The Bloody Tenent of Persecution for Cause of Conscience Discussed*, etc.—his chief work on the nature and sphere of civil government. This book, which had much literary merit, was answered by a book from John Cotton. After returning to Rhode Island, W. went a second time to England on business of the colony 1651, when he published *Experiments of Spiritual Life and Health, and their Preservations*, dedicated to his friend, Lady Vane, and written, as he says, ‘in the thickest of the native Indians of America, in their very wild houses, and by their barbarous fires;’ also, *The Hireling Ministry none of Christ’s*, and (in rejoinder to Cotton) *The Bloody Tenent yet more bloody by Mr. Cotton’s Endeavour to wash it White in the Blood of the Lamb*. At this period he engaged in an experiment of teaching languages by conversation, and was in friendly intercourse with Milton and Cromwell. He returned to Rhode Island 1654, and was elected pres. of the colony; refused to persecute Quakers, but held a keen controversy with them, and published *George Fox digged out of his Burrowes*. On one occasion, to meet three Quakers in public debate, W. rowed in his boat 30 miles to Newport (he was then 72 years of age). W., by his constant friendship with the Indians, was enabled to render inestimable service to the other infant colonies in their weak and exposed condition. Though these services were recognized, and W.’s opponents spoke of him personally in such



terms as were only the due of his excellent Christian character, the other colonies—fearful amid the uncertainties and conflicts of that stormy time—did not admit Rhode Island to their league.—As a great pioneer of governmental liberalism and of individual Christian liberty, W. ranks undoubtedly among the chief figures of the 17th c.—See *Memoirs*, by James D. Knowles (Boston 1833); William Gammell (Boston 1846); Romeo Elton (London 1852); R. A. Guild's *Biographical Introduction*, etc. (Providence 1866). W.'s works, in 7 vols., have been republished by the Narragansett Club (Providence).

WILLIAMS, ROWLAND, D.D.: 1817, Aug. 16—1870, Jan. 18; b. Halkyn, Wales. He studied at Eton; graduated at King's College, Cambridge, 1841; and was tutor there 1842–50. He became chaplain to the bp. of Llandaff 1850; was vice-principal and prof. of Hebrew at St. David's College, Lampeter, Wales, 1850–62; select preacher to the Univ. of Cambridge 1854; and appointed vicar of Broad Chalk 1859. He was concerned in the 'broad-church' movement, and was active in university reform. He was one of the contributors to *Essays and Reviews* (1860), and was condemned for heresy by the court of arches 1862, but the judgment was reversed by the privy council 1864. Among his works are: *Rational Godliness* (1855); *Christianity and Hinduism* (1856); *Broad Chalk Sermons* (1867); *The Hebrew Prophets, a New Translation* (2 vols. 1868–71); *Owen Glendower* (1870); and *Psalms and Litanies* (1872).

WILLIAMS, SAMUEL, LL.D.: Congregational minister: 1743, Apr. 23—1817, Jan. 2; b. Waltham, Mass.; grandson of John W. (1644–1729) (q.v.). He graduated at Harvard 1761; accompanied Prof. John Winthrop to Newfoundland to observe the transit of Venus 1761; taught at Bradford while studying theology; Congl. minister at Bradford 1765–80, continuing his school; and instructed Sir Benjamin Thompson (Count Rumford, q.v.) in natural philosophy, afterward keeping up a scientific correspondence with him. He was Hollis prof. of mathematics and nat. philosophy in Harvard 1780–88; surveyed the w. coast of Mass. 1786; and preached in Rutland, Vt., 1789–95, and in Burlington about two years. He became editor and proprietor of the *Rutland Herald*; surveyed the w. boundary of Vt. 1805; and soon after the establishment of the Univ. of Vermont lectured there for two years on astronomy and natural philosophy. He was a member of several scientific societies, left valuable MSS. on philosophical subjects, and published *The Natural and Civil History of Vermont* (1794). He died at Rutland.

## WILLIAMS.

**WILLIAMS, SAMUEL WELLS, LL.D.:** foreign missionary and author: 1812, Sep. 22—1884, Feb. 16; b. Utica, N. Y.; descendant in the sixth generation from Robert W., a Puritan settler of Roxbury, Mass. W. began study 1831 at the Rensselaer Polytechnic Institute, Troy, N. Y., and while there was engaged to go to China in charge of printing operations under the American Board of Foreign Missions. At Canton, 1833, Oct. 25, he joined E. C. Bridgman in the editorship of the *Chinese Repository*, which he both edited and printed until 1851, his own contributions numbering about 130. In 1835, at Macao, he undertook to complete the printing of Medhurst's Hokkeñ dictionary, with the font of Chinese type left by the E. India Company's China branch, which had been given up. During 1837-8 he began to print Bridgman's *Chinese Chrestomathy*, one-half of which he contributed. His study of Japanese at this time, and the aid of the sailors who taught him, enabled him to make a version in Japanese of the books of Genesis and Matthew. In 1844 he made a journey home by the way of India, Egypt, Palestine, and Italy; and assisted the Presb. Board of Missions in plans to secure a full font of Chinese type from matrices cut in Berlin. To raise money for this he gave courses of lectures on China, which were published, New York (2 vols. 1848), as *The Middle Kingdom*. Returning to China 1842, he undertook a new Chinese dictionary, completed 1856, Aug., and published as *The Tonic Dictionary of the Chinese Language in the Canton Dialect*. In 1853-4 he had served as Japanese interpreter in Com. Perry's two expeditions to Japan; and 1855 he was appointed sec. and interpreter to the U. S. legation in China. His press and more than 7,000 books were burned at the destruction of the foreign factories at Canton 1856, Dec. He resigned, 1857, his connection of 24 years with the American Board, and devoted several years to his great work, *A Syllabic Dictionary of the Chinese Language*, printed and published 1874, at Shanghai. After a visit to America 1875, he took leave of China 1876, after 21 years' service as sec. of legation, with nine periods (amounting to nearly five years) of service as acting U. S. minister. He became prof. of Chinese language and literature at Yale Univ. 1877, and died at New Haven. His *Middle Kingdom* appeared, New York, 1883, completely rewritten, enlarged, and revised to date.

**WILLIAMS, SETH:** soldier: 1822, Mar. 22—1866, Mar. 23; b. Augusta, Me. He graduated at the U. S. Milit. Acad. 1842; served as aide-de-camp to Gen. Robert Patterson during the Mexican war, distinguishing himself at Cerro Gordo; was adjt. of the Milit. Acad. 1850-53; adjt.-gen. on the staff of Gen. George B. McClellan 1861-2, and of the Army of the Potomac under the three succeeding commanders; and was brevetted col. for gallantry at Gettysburg. He served as inspector-gen. of the army on Gen. Grant's staff 1864, Nov., till the close of the war, and was brevetted maj.gen. vols. 1864, and brig.gen. and maj.gen. U. S. A. 1865. He died at Boston.

## WILLIAMS.

WILLIAMS, STEPHEN, D.D.: Congregational minister: 1693, May 14—1782, June 10; b. Deerfield, Mass.; son of John W. (1644-1729) (q.v.). He was carried into captivity by the Indians with his father's family, was redeemed by the gov. of Canada after 14 months, and sent to Boston 1705, Nov. His account of his captivity is appended to the *Biographical Memoir of Rev. John Williams*. He graduated at Harvard College 1713; was ordained to the ministry, and was pastor at Long Meadow, Mass., 1716 till his death there. He acted as chaplain in Sir William Pepperell's expedition against Louisburg 1745, and in expeditions against the French and Indians 1755 and 6, and aided in establishing a mission among the Housatonic Indians at Stockbridge.

WILLIAMS, THOMAS: soldier: 1815-1862, Aug. 5; b. N. Y. He graduated at the U. S. Milit. Acad. 1837; served in Fla. two years; was asst. prof. of math. at West Point Acad. 1840-1; aide-de-camp to Gen. Winfield Scott 1844-50, and distinguished himself at Contreras, Churubusco, and Chapultepec. He served in Fla. against the Seminoles 1856-7, and in Utah 1858; was promoted maj. 1861, May; brig.gen. vols. 1861, Sep. He engaged in the N. C. expedition, and was stationed at Fort Hatteras till 1862, Mar., when he led a brigade in the Ship Island expedition. In the first attempt to take Vicksburg, he commanded the land forces, and projected a canal to divert the Mississippi from the city. After the failure of this undertaking, he had charge of the defense of Baton Rouge, and was killed at the moment of the successful repulse of Gen. Breckinridge.

WILLIAMS, WILLIAM: signer of the Declaration of Independence: 1731, Apr. 18—1811, Aug. 2; b. Lebanon, Conn.; son of the Rev. Solomon W. He graduated at Harvard 1747; studied theology; was with Col. Ephraim W. (founder of Williams Coll.) on the expedition that started for Canada 1755; held the office of town-clerk of Lebanon 45 years, and representative in the colonial and state assemblies more than 50 years, often chosen as clerk or to preside; and was col. of militia. He was elected to congress 1776 and 83. He sacrificed much of his property and time to sustain the army, encouraging enlistments, and giving up his house as transient or winter quarters to the troops. Among other offices held by him was membership in the Conn. committee of correspondence and in the council of safety; and judgeship in the county court and the probate court, the latter for forty years. In 1787 he was prominent in the state convention, urging adoption of the U. S. constitution. His wife was a dan. of Gov. Trumbull. He died in Lebanon.

WILLIAMS, Sir WILLIAM FENWICK, D.C.L.: British soldier, known as the hero of Kars in the Crimean war: 1800, Dec. 4—1883, July 26; b. in Annapolis Royal, Nova Scotia. He graduated at the Milit. Acad., Woolwich, England, 1821; served in Ceylon as army engineer; rose to captaincy 1840; was commissioner at Erzeroum on the



## WILLIAMSBURG.

boundary question between Turkey and Persia; and was promoted lieut.col. 1848, and, by the sultan, lieut.gen. with the title Williams Pasha 1855, when he was sent to relieve Kars (100 m. s.e. of the Black Sea), besieged by the Russians. He defended the city many months, defeated Gen. Mouravieff outside the city, but was compelled finally to capitulate. He was knighted by the queen, received thanks and pension from parliament, of which he was a member 1857-59; and was made commander-in-chief of forces in Brit. N. America 1859, administering the govt. in Canada 1860 and Nova Scotia 1865, in the absence of governors. He was for a while lieut.gov. of Nova Scotia, and later, 1868, having been promoted gen., was gov.gen. of Gibraltar 1870-75. Retiring 1877, he was constable of the Tower until his death in London.

WILLIAMSBURG, *wil'yamz-bérg*: town in Va., between York and James rivers; 60 m. s.e. of Richmond; the site of William and Mary College (q.v.), and of the Eastern State Lunatic Asylum. W. was founded 1632, is the oldest incorporated town in the state, and was the colonial and state capital till 1779. Pop. (1900) 2,044.

WILLIAMSBURG, *wil'yamz-bérg*, BATTLE OF: 1862. May 5; at Williamsburg, Va.: between a Union force under the immediate command of Gen. Sumner and a Confederate force under Gen. Johnston. It was the first serious engagement in McClellan's Peninsular campaign of that year, and was a sequel to the unexpected evacuation of Yorktown by the Confederates (May 4) two days before the time fixed by McClellan for terminating the siege of the place by bombardment and assault. The moment the evacuation was discovered, a large force of cav. and artil. with heavy inf. support, was ordered in pursuit. The advance (Stoneman) found the Confederates intrenched 2 m. e. of Williamsburg, and there awaited the support, while Johnston hastily marched to a stronger position in front of the city. Hooker reached Stoneman during the night (May 4-5), and attacking early in the morning, silenced the guns of Fort Magruder. The Confederates, reinforced, made a series of counter-attacks on Hooker, who held his ground till 4:30 P.M., when Kearny arrived, drove the enemy back, and allowed Hooker to withdraw his exhausted men. In the mean time, Peck's brigade repulsed several attacks on Hooker's right, and Hancock took possession of two works on the enemy's right. Hooker called for reinforcements to enable him to advance and take an inner redoubt, but was ordered to fall back to his first position. He obeyed reluctantly and slowly, though facing a superior force which followed him closely. Anticipating a charge by the enemy, he watched his opportunity, suddenly turned his force and delivered several volleys, and then ordered a bayonet charge, in which his pursuers were totally routed and dispersed. This action closed the fighting for the day, and during the night the Confederates retreated. The losses were about equal on both sides. This battle was one of the most brilliant of the war: Hooker showed remarkable skill and stay.

## WILLIAMSBURGH—WILLIAMS COLLEGE.

ing power, and Hancock's maneuver was equal to anything in the career of that superb commander.

**WILLIAMSBURGH:** a town which is now included in the *Eastern District* of Brooklyn, N. Y.: see **BROOKLYN**.

**WILLIAMS COLLEGE:** second in order of founding of higher institutions of learning in Mass.; at Williamstown, Berkshire co., in the extreme n.w. corner of the state, contiguous to N. Y. and to Vt. The town and college were named after Col. Ephraim Williams (q.v.), who died 1755, in a battle with Indians and French, leaving by will a small sum of money to found a free school. The growth of the fund for about 30 years, with subscriptions in addition, and the avails of a lottery authorized by the state, secured the erection of a building, now West College, 1790, and the opening of a school 1791; and four advanced students in this school, graduated 1795, were counted as the first college class, the legislature having granted a college charter 1792, and given \$4,000 to buy books and apparatus. The Rev. Ebenezer Fitch (1756-1833; b. Conn.; graduate of Yale) was the first pres., 1793-1815, aided during his 21 years by professors of French, of mathematics and nat. philosophy, and of law, and by tutors—39 instructors in all serving under him. The state gave the college lands, which were sold for \$10,000, and the proceeds used to erect East College 1797. There were 460 graduates for the 21 years under Pres. Fitch, an annual average of 22. A notable incident of this period was the start given by five of the students, 1806, to foreign mission work. The second pres., Zephaniah S. Moore, D.D. (1770-1823; b. Mass.; Dartmouth graduate and prof.), served six years, 1815-21: he became very unpopular by his advocacy of a removal of the college to Hampshire co., and having resigned in consequence, became the first pres. of Amherst College. Under the third pres., Edward Dorr Griffin, D.D. (q.v.), grandly successful service was rendered 1821-36; and the high Williams ideal of religious consecration, solid learning, and a broadly useful life, was permanently established. A fine new building, now Griffin Hall, was erected for a chapel, at a cost of \$25,000. Chairs of Greek and Latin, of moral philosophy and rhetoric, of nat. history, and of chemistry, were established. There were 311 graduates during the 15 years, of whom 148 entered the ministry.

The fourth pres., Mark Hopkins, M.D., D.D., LL.D. (q.v.), Williams graduate of 1824, carried the college to very high rank 1836-72, by a union of character, intellect, and moral influence rarely seen. There were 1,491 graduates under him; and after resigning the presidency he continued 15 years longer as teacher of moral and intellectual philosophy, and could say 1886 that he had had 2,229 students under his charge. The observatory, secured by his brother, Prof. Albert Hopkins, 1837, was the first in this country of college observatories applied wholly to astronomy. After the burning of East College 1841, Oct. 17, the present East and South colleges were built 1842. Lawrence Hall, for library, followed 1846; Kellogg



## WILLIAMSON.

Hall 1847, for recitation-rooms and dormitory; Jackson Hall 1855, for nat. history; a president's residence 1858; a stone chapel and an alumni hall 1859; and Goodrich Hall 1865, for gymnasium, and for chemistry and physics. The state gave the college \$75,000 during the war time of high prices, on condition that an equal sum should be raised in addition—a task accomplished by Pres. Hopkins. The development of the teaching force through many new chairs and able professors has gone on steadily from the accession of Dr. Hopkins to the present time, one leading aim of the college being to have the best work of professors rather than instruction by tutors.

On the resignation of Dr. Hopkins, Prof. Paul A. Chadbourne, D.D., LL.D. (q.v.), became pres., serving 1872-81; and at his withdrawal, Prof. Franklin Carter, LL.D. (b. Conn., 1837), a Williams graduate, then prof. at Yale, but earlier (1863-72) at Williams, took the presidency, which he held till 1901, when he resigned. In 1902 he was succeeded by Henry Hopkins, D.D., LL.D., son of Pres. Mark Hopkins, and long a trustee of the college. College Hall was built 1872, for dining-halls and dormitory; Clark Hall 1882, for a cabinet of minerals; the Field Memorial Observatory and Morgan Hall, for a dormitory, 1882; the new Lasell Gymnasium 1883-85; the Mark Hopkins Memorial Building, and additions to the library building, 1889; and 1891 was begun the first of three new laboratories by F. W. Thompson, of New York, value \$100,000. The funds added to the resources of the college under Pres. Carter amount to \$1,000,000. A distinction of Williams is that it does not aim to be a university, and does not adopt the new method of many courses and wide election of studies, but remains simply a college definitely aiming at the best college results. The catalogue issued 1891, Nov., showed a total of 354 students; in 1902 there were 413.

**WILLIAMSON**, *will'yam-son*, HUGH, M.D., LL.D.: miscellaneous writer: 1735, Dec. 5,—1819, May 22; b. West Nottingham, Penn. He graduated at the College of Philadelphia (now Univ. of Pennsylvania) 1757; studied theol. and preached several years; was prof. of math. in his coll. 1760-63; studied medicine in Europe; practiced in Philadelphia; solicited aid in the W. Indies and Europe for the Newark Acad., Del.; was a merchant in Charleston, S. C., and physician Edenton, N. C.; a member of the N. C. assembly 1782, of congress 1784-86, of the U. S. constitutional convention 1787, of the N. C. convention 1789, and of congress 1790-93; then removed to New York, where he died. He was one of the Amer. Philos. Soc. commission to observe the transits of Venus and Mercury 1769; was questioned by the privy council in London 1774 on the Boston tea destruction; acted as surgeon to the N. C. militia 1780-82; helped form the Lit. and Philos. Soc. in New York 1814, and promoted other institutions. He published papers on transits, currency, canals, comets, climate, history, etc., and an imperfect *Hist. of North Carolina* (1812).



## WILLIAMSON—WILLIAMSTOWN.

**WILLIAMSON, JAMES ALEXANDER:** soldier: b. Adair co., Ky., 1829, Feb. 8. He studied at Knox Coll., Ill., became a lawyer, and entered milit. service as lieut. in the 4th Iowa regt. of infantry. For gallantry at Pea Ridge, he was made lieut.col., and soon afterward col. He led in assault near Vicksburg, 1862, Dec. 28, and was dangerously wounded. After the capitulation of Vicksburg, he was in constant service as brigade or division commander. On the taking of Savannah, he was commissioned brig.gen. of vols. 1865, Jan., and in March brevetted maj.gen. Subsequently he was in command of the dist. of Missouri, and on inspection duty on the upper Missouri river. In 1865, Oct., he returned to the practice of law, was commissioner of the land office 1876-81, and chairman of the public lands commission. He was twice chosen chairman of the Iowa delegates to national republican conventions. For some years Gen. W. was in the legal service of a railroad. He died 1902, Sept. 7.

**WILLIAMSPORT, wil'yamz-pōrt:** city, cap. of Lycoming co., Penn.; on the Susquehanna river, and on the Northern Central, the Beech Creek, the Pennsylvania, and the Philadelphia and Reading railroads; 94 m. n. of Harrisburg, 200 m. n.w. of Philadelphia. It is tastefully laid out on a plain at the foot of picturesque hills; is supplied with mountain-spring water, gas and electric light plants, and street railroad service; has stone and wood paved streets; and is widely known for its large lumber interests. The manufacturing industries have a capital of about \$9,000,000, employ about 6,000 persons, and include 15 saw-mills, 13 planing-mills, 8 furniture factories; and paint, wood-working machinery, engine, general machinery, iron and nail, wood decoration, rubber, brick, cigar, paper-box, shirt, and sewing-machine works. In 1902 the city contained 45 churches and missions, high school, and 14 grammar schools. There were Ross and Brandon parks, 2 racecourses and Agricultural Soc. grounds, 4 national banks (cap. \$700,000), 1 state bank (cap. \$11,000), 1 incorporated bank (cap. \$300,000), 1 private bank. The bonded debt was \$758,000, tax valuation \$9,500,000. There were 3 daily, 2 semi-weekly, 3 weekly and 2 monthly periodicals. Among the buildings of note were Dickinson Seminary, Y. M. C. A. hall and library, and the Women's Christian Home. W. became the co.-seat on the organization of the co. 1795, and a city 1861. Pop. (1880) 18,934; (1890) 27,132; (1900) 28,757.

**WILLIAMSTOWN, wil'yamz-town:** town in Berkshire co., Mass.; on the Hoosac river, and on the Fitchburg railroad; 5 m. w. of North Adams, 42 m. e. of Troy. It is widely known as the seat of Williams College (q.v.), and also contains Greylock Institute. The charming location among the mountains, with the healthful air and delightful temperature, has made it a popular summer resort for tourists and boarders. Excellent water-power is derived from the river, with which several woolen and saw mills, and boot and shoe, carriage, and hardware factories are operated. Pop. (1880) 3,394; (1890) 4,226; (1900) 5,013.

## WILLIBRORD--WILLIMANTIC.

**WIL'LIBRORD**, or **WIL'LIBROD**, or **WIL'BRORD**, **SAINT**: first bishop of Utrecht, commonly styled the 'apostle of the Frisians': about 657-738, Nov. 6; b. in Northumbria. He was educated in the monastery of Ripon, where he received the tonsure, but, like most of the monks of that age, he was sent for final instruction to the schools of Ireland. After a sojourn there of 13 years, he devoted himself to the conversion of Friesland, in which some of his fellow-monks had already engaged with little success. In 690 he sailed with 12 companions; and passing up the Rhine, arrived at Ultrajectum, the present Utrecht, soon after the victory of Pepin over the Frisians. Pepin cordially received the missionaries; and W., having established the beginnings of his mission, went to Rome 692 whence he returned with the sanction of Pope Sergius I., and continued his labor till 695, when he again visited Rome, and received episcopal consecration, with the pallium of an archbishop, 696. Fixing his see at Utrecht, he converted a large number of the inhabitants, and extended his missionary colonies from that centre as far as the Danish provinces, and though he received some check at the death of Pepin 714, yet the successes of Charles Martel enabled him soon to resume, under similar favorable auspices, the work which, after many alternations, ended in the successful establishment of Christianity. W. died at the monastery which he had founded at Echternach, near Treves. His festival is Nov. 7.—See Bede's *Ecclesiastical History*, chaps 10 and 11.

**WILLICH**, *vil'lich*, **AUGUST**: soldier: 1810-1878, Jan. 23; b. in Gorzyn, Prussia. Early bereft of his father, a milit. officer, he was brought up in the family of the theologian Schleiermacher; and was educated for the army, becoming lieut. of artillery 1828, capt. 1841. In 1846 he was court-martialled for resigning in terms too strongly republican, but was permitted to retire. After participating in the revolution of 1848, he fled, and took up the carpenter's trade in England, whence he came to the United States 1853, worked in the Brooklyn navy-yard, was employed on the coast survey, and edited a paper in Cincinnati. In 1861 he was commissioned maj. and then col. in German regiments, which under his drill became famous. Promoted to brig.gen., he was made prisoner at Stone River, but was exchanged, and had part in the campaigns of Gen. Sherman 1863-65, when he was brevetted maj.gen. After the war he was county auditor in Cincinnati, and later resided at St. Mary's, O., where he died.

**WILLIMANTIC**, *wil-i-mān'tik*: a city in Windham co., Conn.; on the Willimantic river, and on the Central Vermont, the New York New Haven and Hartford, and the New York and New England railroads; 32 m. e.-by-s. of Hartford, 86 m. s.w. of Boston. The river here falls 100 ft. in 1 m., affording excellent water-power, utilized by notable establishments for manufacturing cotton thread, silk, cotton warps, print cloths, machinery, woolen goods, and tin and iron ware. W. is laid out with broad streets and concrete sidewalks, and has gas and electric lights, 1 nat.



## WILLING—WILLIS.

bank (cap. \$100,000), 2 savings banks, 1 loan and trust company, and 3 weekly newspapers. Pop. (1880) 6,608; (1890) 8,648; (1900) 8,937.

**WILLING**, *wil'ing*, **THOMAS**: first president of the Bank of the United States: 1731, Dec. 19—1821, Jan. 19; b. Philadelphia. He was educated in England, where also he studied law. 1754–93 he was principal partner of the firm of Willing & Morris, merchants and agents for supplies to the revolutionary army and navy. At different times he held almost every kind of justiceship, up to that of the Penn. supreme court; led in movements against British aggressions, and in favor of a congress; was a member of revolutionary committees, also of the colonial assembly, and of congress 1775–6; voted against the Declaration as premature; but, 1780, came to the rescue of the patriot cause by subscribing largely to establish the Pennsylvania Bank as a measure to sustain the war. He was first pres., 1781–2, of the first chartered bank, that of N. America; and first pres. of the U. S. Bank. He died in Philadelphia.

**WILLIS**, *wil'iss*, **NATHANIEL PARKER**: author: 1806, Jan. 20—1867, Jan. 20; b. Portland, Me.; son of Nathaniel W. (1780–1870), projector and publisher (1816) of the *Boston Recorder*, one of the earliest weekly religious newspapers in the world—also founder (1827) of the well-known *Youth's Companion*, said to be the earliest of all papers for children. W. graduated 1827 at Yale, where he obtained a prize of \$50 for a poem. Among his earliest works were *Scriptural Poems*, poetic narrative versions from the Bible; these quickly gained wide popularity. In 1829 he established the *American Monthly Magazine*, afterward merged in the *New York Mirror*, in which he was associated with George P. Morris. In 1830 he visited Europe, and contributed to the *Mirror* his *Pencillings by the Way*. Appointed *attaché* to the American legation at Paris, he had favorable opportunities for observing European society; and after a visit to Greece and Turkey went to England 1835, and was married to a daughter of a Brit. officer, Gen. Stace. While in England, on account of some personal allusions in his writings, he became involved in a quarrel with Capt. Marryat, which led to a bloodless duel. He contributed to the London *New Monthly* his *Inklings of Adventure*, pub. also in three vols.; and 1839 returned to New York, and published a literary paper, *The Corsair*, and *Letters from under a Bridge*, written at his romantic country-seat near Owego, N. Y., named, in compliment to his wife, Glenmary. To the *Corsair*, William M. Thackeray, then an unknown writer, was a regular contributor. W. wrote also at this period *Tortosa the Usurer* and *Bianca Visconti*, dramas; and the descriptions of scenery illustrated in Bartlett's *United States and Canada*. In 1844 he was again engaged with Gen. Morris, editing the *New Mirror*. His wife died, and he revisited Europe, and published *Dashes at Life with a Free Pencil*, 1845; returned to New York 1846; and married a daughter of the Hon. Joseph Grinnell, of Mass.; and with Morris es-



## WILLISTON—WILLOW.

established the *Home Journal* (still a prosperous publication), to which he contributed most of the following works, pub. also in collected form; *People I have Met*; *Life Here and There*; *Hurrygraphs*; *Memoranda of a Life of Jenny Lind*; *Fun Jottings*; *A Health-trip to the Tropics*; *A Summer Cruise in the Mediterranean*; *Famous Persons and Places*; *Out-doors at Idle Wild*; *The Ragbag*; etc. Much of this work was done during a long, brave struggle with what appeared to be consumptive disease. Mr. W. was an observant and thoughtful writer, discursive, fragmentary, picturesque, sprightly, quaint, and exceedingly graceful in both poetry and prose, full of elaborate ease and ingenious spontaneity; though his style was marred by occasional affectations. He was of a very kindly disposition. He edited the *Home Journal* and resided at his romantic highland retreat of Idle Wild, on the Hudson, near Newburgh, until his death.—His sister, SARA PAYSON W., was a popular writer, under the *nom de plume* 'Fanny Fern': see PARTON, JAMES.—His brother, RICHARD STORRS W., b. Boston, 1819, graduated at Yale 1841, is a well-known musical critic and editor.

WILLISTON, *wil'is-ton*, SAMUEL: educational benefactor: 1795, June 17—1874, July 18; b. Easthampton, Mass.; son of the Rev. Payson W., Congl. pastor in that town 44 years. His education was interrupted by ill health; and he began to sell cloth-buttons made by his wife and assistants, the first manufactured in this country. Joel Hayden, of a neighboring town, invented machinery for the work, and went into partnership with W., who acquired large wealth in this and other manufactures. Besides giving freely to many objects, he founded 1840 the high-class preparatory school at Easthampton (Williston Seminary), his entire gifts to which were \$770,000. To Amherst Coll. he gave \$150,000, and much to Mt. Holyoke Seminary. His benefactions have been estimated at \$1,500,000. He died in Easthampton.

WILL'-O'-THE-WISP, or WILL'-WITH-A-WISP: see IGNIS-FATUUS.

WILLOUGHBY, *wil'ō-bī*, LAKE: lake in n. Vt., about 24 m. n. of St. Johnsbury; in the tp. of Westmore, Orleans co.; 7 m. long, 2 m. wide, and very deep. It lies between two mountains, of which the highest, Willoughby Mountain, rises about 3,800 ft. above sea-level, and has many rare plants, and presents a fine view from its summit. The lake is an attractive summer resort.

WILLOW, n. *wil'lō* [AS. *welig*; Dut. *wilg*; Low Ger. *wilge*, a willow]: a plant growing freely in a moist soil, whose twigs or branches are very flexible, and are extensively employed in the manufacture of all kinds of basket-work; a tree having slender, pliant branches, often of large size; the name for various species of *Salix*, ord. *Salicaceæ*. *S. Babylonica* is the weeping willow; hence, the willow, as in the phrase 'to wear the willow,' has been regarded as a token of sorrow or mourning. WIL'LOWED, a. *-lōd*, abounding in willows. WIL'LOWY, a. *-lō-ī*, abound-

## WILLOW.

ing in willows; resembling the willow; having a drooping form. WIL'LOW-HERB, a plant growing in moist places; the *Epilobium angustifolium*, ord. *Onagrææ* (see EPILOBIUM).

WIL'LOW: amentaceous tree or shrub of the genus *Salix*, type of the nat. order *Salicaceæ*; to which the Poplar (q.v.) also belongs. Plants of this order are distinguished by having the flowers naked or with a cup-like perianth; numerous ovules; a naked, leathery, one-celled, two-valved fruit; seeds with long hairs; leaves with stipules. In the willows, the flowers are absolutely naked, stamens from one to five in number, leaves simple and deciduous. There are many species (160 have been enumerated), but their precise number is not likely to be soon determined, as they are very difficult to distinguish botanically, and varieties are very numerous. They are natives mostly of colder temperate regions of the n. hemisphere, though some are found in warm countries, as *Salix tetrasperma* in the hottest parts of India, and another species abundantly on the banks of the Senegal. Most of them are shrubs, some of very humble growth, particularly those of arctic and alpine regions. Thus, *S. herbacea*, common on the mountains of Scotland, seldom rises more than an inch from the ground. This and Cutler's W. and the Silvery-fruited W. are alpine species, on the White Mts. of N. H., and northward. *S. arctica* and *S. polaris* are the most northern woody plants. Other small species are found also at the very limits of perpetual snow, e.g., *S. Lindleyana* on the Himalaya. For some of the species, see OSIER: SALLOW. Some of those which more generally receive the popular name W. are trees of large size and remarkably rapid growth.

The N. Amer. species are numerous, not less than 16 native in the n. states, e. of the Mississippi river, of which two, the Myrtle W. and the alpine Herb-like W., are found also in Europe. Of the shrubby kinds, the Hoary W., with web-like wool, and the Dwarf Gray W., with catkins at first globular, are found in bogs; the Prairie W. has the small catkins often recurved; the Silky W., of sandy river banks, has the sterile catkins globular; the Glauous W., with large, long-haired catkins,  $1\frac{1}{2}$ – $2\frac{1}{2}$  in., is from 8 to 15 ft. high and common; the Heart-leaved W., abundant in low, inundated places, with several varieties, has leaves  $2\frac{1}{2}$ –6 in. long, and is a shrub or small tree, as also the Livid W., with semilunar stipules, and the Shining W., common on streams. The last and the Black W., a tree with rough black bark, have three or more stamens. The Long-leaved W. roots extensively in sand and gravel on river banks—most common in the west.

Of European species introduced into the United States, two are tall trees, the Brittle W. (*S. fragilis*), with several varieties; and the White W. (*S. alba*), with its yellow-branched variety, *vitellina*. In the old country the wood of both species has been used for many purposes, being remarkably durable, especially in damp situations, though light and soft. It was used anciently for shields. Cork-



## WILLOW-MOTH—WILLS.

cutters and others employ it for whetting sharp-edged implements. It is very tough. It is used for making paddles of steamboats, because it wears better in water than any other kind of wood. Willows are often planted on the banks of rivers, to retain the soil in its place, and restrain the encroachments of the stream. They are well adapted for this purpose as they grow readily by cuttings; and willow-stakes driven into a moist soil strike root, and soon become luxuriant. The twigs of some willows are very tough and flexible, and are much used for basket-making and other wicker-work: see OSIER. The Basket Osier (*S. viminalis*) is becoming naturalized in this country. Also the Purple W. (*S. purpurea*), the twigs olive-colored or reddish. Willow-trees are sometimes treated as pollards, and the lop used for fuel and other purposes. The leaves and young shoots are in some countries used as food for cattle, and even dried and stacked for that use. A fragrant water is distilled in n. India from the catkins of the Egyptian or Caliph W. (*S. Egyptiaca*). A principle called *Salicine* exists in the bark of willows, which has been found efficacious in intermittent fevers, and is sometimes used as a substitute for quinine: it is crystalline and intensely bitter.—The flowers of the W., which in many species appear before the leaves, are much sought by bees. The male catkins of many species are very beautiful, the prominent anthers being of fine yellow color, or as in *S. purpurea*, of rich purple. The Weeping W. (*S. Babylonica*) (see WEEPING-TREES) is a very ornamental species, native of the East, now much planted in N. America as well as in Europe, for its beautiful pendent twigs. What is called Napoleon's W. is a variety of it.

**WIL'LOW-MOTH** (*Caradrina cubicularis*): species of moth, the caterpillars of which feed on the grain of wheat, often doing great mischief. The perfect insect is of a mouse color, and its wings are closed flat upon its back when it is at rest. On the upper wings are three transverse wavy lines, and some black dots. The under wings are pearly white, with slight tinge of brown near the fringe, and brownish nervures. The body is slender, the antennæ are thread-like. The whole length, without the antennæ, is rather more than half an inch. The caterpillar varies in color from dull ochreous red to dirty green, with blackish head, two brown spots on the first segment, a wavy line on each side edged with black. The caterpillar feeds on grain through the winter, and draws the kernels together with a thin silken web when about to assume the chrysalis state.

**WILLS**, *wilz*, JAMES: founder of Wills Hospital, Philadelphia: 1760–1830; b. England. His fortune was in part by inheritance, in part from his own business in Philadelphia, where he was an honored member of the Society of Friends, and, at his death in that city, left \$122,000 to found a hospital for the indigent blind and lame, opened several years later.



## WILLY NILLY—WILMINGTON.

WILLY NILLY, colloquial phrase, *wil'li nil'li*: will he or will he not; whether one will or will not.

WILMINGTON, *wil'ming-ton*: city, port of entry, and cap. of New Castle co., Del.; on the Delaware river and the Brandywine and Christiana creeks; and on the Baltimore and Ohio, the Philadelphia Wilmington and Baltimore, and the Wilmington and Northern railroads; 28 m. s.w. of Philadelphia, 70 m. e.n.e. of Baltimore. Both creeks are navigable for vessels drawing 7-14 ft.; city wharves extend along them for 6 m.; and the Brandywine is fringed with mills and factories, to utilize the power afforded by a fall of 120 ft. in the creek within 4 m. of the city. The city is built mainly between the two creeks, on high ground, which rises by three slopes to 240 ft. above tide-water; has wide, straight streets, either parallel with the Christiana or with Market st., which extends the entire length of the city and is the principal business thoroughfare; buildings chiefly of brick; gas and electric light plants; water-works and good drainage. In 1902 the bonded debt was \$1,959,350; assessed valuation of real property (personal not assessed) \$43,000,000; tax-rate \$2.20 per \$100. In 1891 there were 78 m. of streets, 810 street lamps, 414 electric lights, 41,000,000 gals. capacity of waterworks reservoirs, 6,000,000 gals. daily consumption, fire dept. of 7 engines (annual cost \$24,000), and police dept. of 58 officers (annual cost \$48,000). Of banks (1902) there were 5 nat. (cap. \$1,223,175), 2 savings, and 2 trust; and of periodicals there were 6 daily, 7 weekly and 2 monthly.

The churches and missions aggregate: 83—viz., Meth. Episc. 31; Bapt. 13; Prot. Episc. 10; Presb. 11; Rom. Cath. 10; Luth. 2; Friends 2; Ref. Episc. 2; Swedenborgian 1, and Unit. 1. During the school year 1900-01 the enrolment of children in the pub. schools was 11,019, and the average daily attendance 8,476. The funds available for sch. maintenance for the year were \$400,242, expenditures \$388,637, balance \$11,605. The high school had 639 students, and grounds, buildings, etc., val. at \$256,000. There were 2 business colleges, 2 training schools for nurses. Other educational institutions are the Friends' School for both sexes (opened 1748); State Nor. Univ. (1866); Wesleyan Female College; Rugby Acad. for boys; the Delaware Institute for both sexes; and the pub. library. The manufactures include foundry products; leather; railroad cars and car-wheels; iron ships, carriages and wagons; paper, tobacco, cotton goods, chemicals, fertilizers; flour and grist mill products; and boots and shoes. The U. S. custom-house, post-office, city hall, almshouse, opera-house, and several charitable institutions are among notable public buildings. W. was founded 1732, incorp. as a city 1832, and contains a stone church erected by Swedes 1,638. Pop. (1880) 42,478; (1890) 61,431; (1900) 76,536.

## WILMINGTON—WILMOT.

**WILMINGTON:** city, port of entry, and cap. of New Hanover co., N. C.; on Cape Fear river, 30 m. from the ocean, and on the Carolina Central, the Wilmington and South Coast, the Wilmington and Weldon, the Wilmington Columbia and Augusta, and the Wilmington Onslow and East Carolina railroads; 134 m. s.s.e. of Raleigh, 189 m. e. of Columbia, S. C. Besides its large railroad connections, it has regular steamboat lines to Baltimore, Philadelphia, and New York, and a large sailing fleet communicating with all parts of the world; hence its foreign and domestic trade is extensive and rapidly increasing. During the year ending 1891, June 30, the imports aggregated \$223,378, and the domestic exports \$9,070,235. Of the total exports \$247,308 were in American sailing-vessels, \$7,378,110 in foreign steam-vessels, and \$1,444,817 in foreign sailing-vessels. The foreign trade entrances were 18 American vessels of 4,756 tons, and 121 foreign vessels of 60,908 tons—total vessels 139, tonnage 65,664; clearances 72 American vessels of 17,649 tons, and 149 foreign vessels of 83,564 tons—total vessels 221, tonnage 101,213. During the year 65 vessels of 6,280.88 tons were registered, enrolled, and licensed in the custom-house; and 8 vessels of 155.27 net tons were built. During the year ending 1903, June 30, imports of merchandise aggregated \$294,688; exports \$14,966,754; cotton exported, 324,568 bales, \$14,364,321. Rosin, tar, turpentine, lumber and rice are exported, also. The leading manufactures are cotton goods, hosiery, naval stores, machinery, guano, pine fibre, carpets, fertilizers, creosoting oil, foundry products, flour and rice, shingles, and sash and blinds. Excellent rice is grown on two islands opposite the city, inclosed by different channels of the river.

In 1901 there were 40 churches, 1 nat. bank (cap. \$150,000), 1 state bank (cap. \$300,000), 1 sav. and trust co., public library, 30 benevolent soc., several academies; and 3 daily, 1 weekly, 1 bi-weekly, and 2 semi-monthly periodicals. The bonded debt was \$600,000, assessed property valuation \$11,368,395, tax-rate \$2.43 on \$100. The notable buildings include U. S. custom-house, U. S. marine hospital, court-house, city hall, seamen's home, and theatre. The city is lighted by gas and electricity, has adequate water-works, and supports a fire dept. with steam-engines and fire-alarm.—W. was laid out 1733 under the name Newton, and incorporated as a city 1866. During the civil war it was long the principal Confederate port open to blockade-runners. For Federal operations here, see FISHER, FORT, ATTACKS ON, AND CAPTURE OF.—Pop. (1880) 17,350; (1890) 20,056.

**WILMOT**, *wil'mot*, DAVID: statesman: 1814, Jan. 20—1868, Mar. 16; b. Bethany, Penn. Educated at Bethany and at Aurora, N. Y., he practiced law in Towanda, Penn., and was democratic mem. of congress 1845-51. In 1846 he moved in congress his famous amendment to a bill appropriating \$2,000,000 to negotiate peace with Mexico, and with reference to acquiring a part of her territory; it became known as the Wilmot Proviso, and made a con-



dition of the purchase that 'neither slavery nor involuntary servitude shall ever exist in any part of said territory, except for crime, whereof the party shall first be duly convicted.' This amendment was adopted by the house, but not acted on by the senate; the same result occurred in the next session; and from the fierce discussion sprang the free-soil movement that nominated Martin Van Buren less than two years later. W. was presiding judge of the Penn. 13th district 1853-61, a mem. of the national republican conventions 1856 and 60, U. S. senator 1861-63, and judge of the U. S. court of claims 1863 until his death, which occurred in Towanda.

WILMOT, JOHN: see ROCHESTER, Earl of.

WIL'NA: see VILNO.

WILSON, *wil'son*, ALEXANDER: Scottish-American ornithologist: 1766, July 6—1813, Aug. 23; b. Paisley, Scotland. He was son of a weaver, and was apprenticed to the weaving trade, at which he worked 7 years, amusing himself by writing verses. As soon as he was free he gratified a roving disposition by shouldering a pedler's pack, and going to Edinburgh to take part in a discussion, in which he maintained the poetic claims of Fergusson against Allan Ramsay. He was prosecuted for a lampoon on a resident of Paisley, and condemned to a short imprisonment, and to burn the libel with his own hand at the Paisley cross. Determined to leave a country where his genius was unappreciated, he sailed from Belfast, and landed at New Castle, Del., 1794, July 14, with a few borrowed shillings in his pocket, and no acquaintances. He got work with a copper-plate-printer in Philadelphia, then with a weaver; travelled as a pedler in N. J., where the brilliant plumage of the birds attracted his attention; taught school in Penn., and later in N. J. In the latter state he made the acquaintance of William Bartram, the naturalist; and, stimulated and encouraged by him, W. resolved to make a collection of the birds of N. America. 1804, Oct., he set out on his first excursion, in which he travelled to Niagara Falls, and wrote *The Forresters, a Poem*, of which, as of his other poetic work, little need be said. In 1805 he learned to etch, and became an asst. editor of *Rees's Cyclopædia*. He soon prevailed on the publisher, Bradford, to undertake an American ornithology. In 1808, Sep., he brought out the first vol., but in a style too costly for the tastes and fortunes of the period, so that he obtained only 41 subscribers in the e. states, and had no better success in the s. The 2d vol. was, notwithstanding, brought out 1810. In 1811 he made a canoe voyage down the Ohio, and travelled overland through the Lower Mississippi valley, from Nashville to New Orleans, collecting specimens for his 3d volume. In his eager pursuit of a rare species, he swam across a river, and caught cold, which ended in his death at Philadelphia. The 8th and 9th vols. were published after his death. The work was continued by Charles Lucien Bonaparte, in 4 vols. (1825-33). A monument was erected to his memory in Paisley Abbey churchyard 1874.



## WILSON.

—W.'s great work is unrivalled in description, and scarcely rivalled in fidelity of delineation. It is a classic in its department, and a monument of enthusiasm and perseverance.—See Grossart's *Poems and Miscellaneous Prose of Alexander Wilson* (Paisley 1876).

WIL'SON, ALLEN BENJAMIN: inventor of improvements culminating in the Wheeler and Wilson sewing-machine: 1824, Oct. 18—1888, Apr. 29; b. Willet, N. Y. While working at his trade of cabinet-making in Pittsfield, Mass., 1849, he devised a sewing-machine which made a stitch with each movement of a double-pointed shuttle, forward and backward. In 1851 he invented a rotating hook, improving on the lock-stitch and dispensing with a shuttle, and in 1852 a four-motion feed, producing a stitch alike on both sides of the cloth and not liable to unravel. The partnership with Nathaniel Wheeler, begun in Watertown, was removed to Bridgeport, where the factory grew to unequal proportions in this industry, with a productive capacity of nearly 15,000 machines a month. W. died in Woodmont, Conn.

WIL'SON, ALPHEUS WATERS, D.D.: Methodist Episc. bishop: b. Baltimore, 1834. Educated in Baltimore and Washington, he left medical study, and in 1853 began preaching with great acceptance. In 1878 he was chosen sec. of the Southern Meth. Episc. Board of Missions, and 1882 bishop. He made a tour of the world 1888-9. As a speaker and administrator he ranks high. He has published *Influence of Methodism on Other Denominations* (1881, delivered as an address at the ecumenical conference in London); and *Missions* (1882).

WIL'SON, DANIEL, D.D.: English bishop: 1778, July 2—1858, Jan. 2; b. London. Six years an apprentice to a silk manufacturer, he became at the age of 20 a student at Oxford, and three years later was ordained. He was curate 1802; Oxford prize essayist 1803; tutor at St. Edmund's Hall 1804; vice-principal, and curate of Worton, 1807-12, after which he ministered in St. John's Chapel, London, and was vicar of Islington. In 1832 he was consecrated bp. of Calcutta and metropolitan of India. Among his published works are: *Lectures on Christian Character*, on the *Epistle to the Colossians*, on the *Evidences of Christianity*; *Sermons on India*, on *Christian Doctrine*, on *The Lord's Day*; and *Sufficiency of Scripture as a Rule of Faith*.—See *Life* by the Rev. J. Bateman (1860). The lectures on Christian doctrine, and on the evidences, became widely known as standard works. Bp. W. was evangelical in doctrine, devoted in spirit, an unremitting worker, and solid in attainments. His episcopal jurisdiction included all India, the island of Ceylon, Australia, New Zealand, and Tasmania, and he administered his charge with zeal and energy for a quarter of a century.

## WILSON.

WILSON, Sir DANIEL, LL.D.: Scottish-Canadian archæologist and educator: b. 1816, Jan. 5, at Edinburgh, Scotland. He was educated at the Univ. of Edinburgh, and was early attracted by antiquarian studies. He had been for some time sec. to the Scottish Soc. of Antiquaries, when he was appointed, 1853, prof. of history and English literature in the Univ. of Toronto, whose prosperity he greatly promoted, and became its pres. 1881. In 1882 he was named vice-pres. of the literature section of the Royal Soc. of Canada, and 1885 became its pres. He was knighted by the queen 1888. Among his works are: *Memorials of Edinburgh in the Olden Time* (1848; new ed. 1878); *Oliver Cromwell* (1843); *Archæology and Pre-historic Annals of Scotland* (1851; 2d ed. 1863); *Pre-historic Man: Researches into the Origin of Civilization in the Old World and the New* (2 vols. 1862; enlarged and rewritten, 3d ed. 1876); *Chatterton* (1869); *Caliban: the Missing Link* (1873); a volume of poems called *Spring Flowers* (1875). For four years he edited the journal of the Canadian Institute, of which, 1859 and 60, he was president. Died 1892, Nov. 29.

WILSON, GEORGE, M.D., F.R.S.E.: Scottish chemist: 1818, Feb. 21—1859, Nov. 23: b. Edinburgh; younger brother of Sir Daniel W. He was educated at Edinburgh, where he graduated also in medicine, and received a license as lecturer on chemistry from the Royal College of Surgeons 1840. He subsequently became lecturer on chemistry in the School of Arts and in the Veterinary College, and 1855 was appointed prof. of technology in Edinburgh Univ. With this office he held the curatorship of the Industrial Museum. Among his scientific works are: *Text-book on Chemistry* in Chambers's *Educational Course*; *Researches in Color-blindness*; and *The Five Gateways of Knowledge*. Other works are: *Life of Cavendish* (1851); *Life of Dr. John Reid* (1852); and, with Mr. Geikie, *Memoir of Edward Forbes* (1861). There are also several poems from his pen. A memoir, illustrating his singularly attractive character, was published by his sister (Mrs. Sime) 1860.

WILSON, GEORGE FRANCIS: inventor: 1818, Dec. 7—1883, Jan. 19; b. Uxbridge, Mass. After apprenticeship in a woolen-mill in his native place, he became a student and then a teacher at Shelburne Falls, Mass.; and 1844 opened an acad. in Chicago. Four years later he engaged in manufacturing in Providence, R. I., and in 1857 established the Rumford chemical works in connection with Prof. E. N. Horsford of Cambridge, Mass. Besides improvements in this industry, he made others in the paper manufacture and in light-house illumination. At the same time he made investigations in agriculture; and was elected repeatedly to the legislature. He died in East Providence, bequeathing \$50,000 to the scientific dept. of Dartmouth Coll. and \$100,000 to Brown University.

## WILSON.

WILSON, HENRY: statesman: 1812, Feb. 16—1875, Nov. 22; b. Farmington, N. H.; son of Winthrop and Abigail Colbath, hard-working people, of Scotch-Irish descent, and of character and mind above their lot. The name Henry W. was taken at the age of 21 by change from Jeremiah Jones Colbath. When very young, W. was taught reading and arithmetic; and the gift of a New Testament in his 9th year, on condition of his reading it through, as he did in a week, started him as a scholar, who, at 21, had read nearly a thousand volumes, including all the *N. Amer. Review*. From the age of 10 years (1822, Aug. 7—1833, Feb. 16) he served an apprenticeship to a farmer, with one winter month's schooling each year, the kitchen firelight to read by, not more than one dollar spent by him in the 11 years; receiving besides home and clothing, as a wage for the whole time, six sheep and a pair of oxen, which netted him \$84 to begin manhood with. Unable to earn more than \$6 by hard toil in his first month of freedom, and not finding work, he migrated to Natick, Mass., 1833, Dec., taking the hundred miles on foot, and going by way of Boston to see Bunker Hill and the *N. Amer. Review* office. Learning shoemaking in seven weeks, working with skill and speed equalled by no other workman, often taking a whole night, and once finishing nearly a week's work without sleep, he rapidly mastered the tasks and profits of his new trade. Hearing Everett on Lexington, 1835, April 19, and Webster in Boston, and learning to think on his feet in a debating society at Natick, he soon gave evidence of the genius for action and speech which were to make him notable in American statesmanship. A visit to Washington, 1836, May 15—June 15, showed him facts of slavery which determined his unflinching lifelong stand on anti-slavery principle. From July 1, with \$700 of earnings in hand, Wilson undertook academy study and winter teaching, five terms in N. H., and one term in Natick in charge of a winter school; and in the spring of 1838, with a capital of \$12, he entered for ten years on shoe manufacturing.

The Harrison campaign of 1840 brought him out as an effective political speaker, and with Harrison's election he became a Mass. state representative 1841; was elected to the state senate 1844, and again 1845; became representative again 1846; was a supporter of Webster in the whig national convention 1848, June; but bolted Gen. Taylor's nomination and helped start the free-soil party, which nominated Van Buren; was again representative 1850; arranged the coalition which elected Geo. S. Boutwell gov. and made Charles Sumner and Robert Rantoul U. S. senators; 1851 was returned to the state senate and made its pres., and again, 1852; was chairman of the Pittsburgh free-soil convention the same year, and barely failed of election to congress; was defeated 1853 as free-soil candidate for gov.; but 1855, acting with the American party, was chosen to the U. S. senate, where he served 18 years, 1855, Feb. 10—1873, Mar. 3, when, as vice-pres., in Gen.



Grant's second term, he rose from the floor of the senate to the chair of its president.

As U. S. senator, Wilson became a foremost leader against compromise with slavery. He boldly predicted, against Senator Douglas, not only the struggle of 1856, but also the anti-slavery victory of 1860. The break-up of the American party, 1855, June, was his work, facing a Virginian's pistol to oppose compromise principles in the convention at Philadelphia; and he was one of the leaders, in Mass. and at Washington, in organizing the new republican party. Re-elected to the senate 1859, Jan., he gave the most energetic support to Abraham Lincoln's candidacy for the presidency 1860; and on the issue of compromise or contest raised by Lincoln's election he unflinchingly opposed, 1861, Feb., Crittenden's measures of compromise. When challenged to a duel by Preston S. Brooks for his denunciation of Brooks's assault on Charles Sumner, W. declined—stigmatizing duelling as barbarous and unlawful; but announcing that he fully believed in and should exercise the right of self-defense. He was not attacked. When contest began at Fort Sumter, his foresight of 'tremendous conflict' and 'the doom of slavery' was instant, and his advice and action in relation to war bold and energetic. In his own state he had served in the militia nine years, 1843-52, from major to brig.gen., and shown remarkable military gifts. He now succeeded Jefferson Davis as chairman of the senate milit. committee, and set in motion that long course of legislative action and army organization of which the final result was the victory of the Union and the destruction of slavery.

Re-elected to the senate 1865, Feb., W. was foremost in efficient garnering of the results of the war, in wise conduct of reconstruction, and in securing settled peace. His eminent service to the freedmen, the outcome of a life of ardor for equal liberty, was justly recognized when, in the convention at Philadelphia which renominated Pres. Grant, a close contest for the second place on the ticket terminated in favor of W. by the action of a negro delegate, representing Va., announcing the 'change of the vote of Va. to Henry Wilson.' But excessive labor had worn too much upon him to permit his living out the term as vice-pres. to which he was elected 1872, Nov. He suffered successive attacks of paralysis 1873-75, and died in his room at the Capitol, not yet 64 years of age. W. was notable for sincerity, earnestness, and high Christian integrity in all private and public life. His long public service gave him opportunities for wealth, and his mode of life was always simple and plain; but he died as he had lived—a poor man as the world counts possessions. Death found him at his post of duty; and he died rich enough to bequeath to his country the memory of a public life utterly simple, straightforward, and sincere. His public speeches were admirably clear and forcible, with no attempt at the graces of a polished style.

He published: *History of the Anti-slavery Measures of the 37th and 38th U. S. Congresses, 1861-65* (1865); *Military*

## WILSON.

*Measures of the U. S. Congress, 1861-65* (1866); *The History of the Reconstruction Measures of the 39th and 40th Congresses, 1865-68* (1868); and *The History of the Rise and Fall of the Slave-power in America* (vol. I. 1872, II. 1874, III. 1876). His speeches which appeared in print numbered about 1,300.

WILSON, HORACE HAYMAN: distinguished Sanskrit scholar: 1786, Sep. 26—1860, May 8; b. London, England. He was educated for the medical profession, and 1808 went to India as asst. surgeon on the Bengal establishment of the E. India Company; and being proficient in chemistry, soon obtained an appointment in the Calcutta mint as assistant to Dr. Leyden. He now applied himself diligently to the study of Sanskrit, and obtained so high a reputation for scholarship that, 1811, he was appointed sec. of the Asiatic Soc. of Bengal. In 1813 W. published his first work, *The Mégha Dûta, or Cloud Messenger, a Poem in the Sanscrit Language, by Kâlidâsa; translated into English Verse, with Notes and Illustrations, by H. H. Wilson* (Calcutta 1813, reprinted London 1814). His next publication was *A Dictionary, Sanscrit and English, translated, amended, and enlarged from an original Compilation prepared by Learned Natives* (Calcutta 1819-40)—a work of great advantage to students of Sanskrit. In 1832 the Boden professorship of Sanskrit was founded in the Univ. of Oxford, and W. was elected to that lucrative post, not without strong competition. Soon after his arrival in England, he was appointed librarian at the E. India House, and held this appointment with the professorship. In 1837 he succeeded Colebrooke as director of the Royal Asiatic Soc. He was married to a granddaughter of the celebrated Mrs. Siddons. W., as an orientalist, takes rank with Sir W. Jones and H. T. Colebrooke. Many of his researches are embodied in papers contributed to the *Journal of the Asiatic Soc. of Bengal*, and other periodicals. A collected ed. of his works was published, 12 vols. 1864-70. Among them are: *Select Specimens of the Theatre of the Hindus, translated from the Original Sanscrit*, 3 vols. (Calcutta 1827); *The Raghu Vansa, or Race of Raghu, a Historical Poem, by Kâlidâsa, with a Prose Interpretation of the Text, by Pundits of the Sanscrit College of Calcutta* (1832), edited by W.; *The Vishn'u-Purân'a, a System of Hindu Mythology, translated from the Original Sanscrit, and illustrated by Notes* (Lond. 1840); *An Introduction to the Grammar of the Sanscrit Language* (Lond. 1841); *Ariana Antiqua, a Descriptive Account of the Antiquities and Coins of Afghanistan* (Lond. 1841); *History of British India from 1805 to 1835* (1848); *Rig-Veda-Sanhita, a Collection of Ancient Hindu Hymns, translated from the Original Sanscrit* (1850); *A Glossary of Judicial and Revenue Terms, from the Arabic, Persian, Hindustani, etc.* (1855); *Principles of Hindu and Mohammedan Law, republished from the Principles and Precedents of the Same, by the late Sir William Hay Macnaghten, and edited by H. H. Wilson* (Lond. 1860). Many of these were produced while W. held the office of assay-master and sec. of the mint at Calcutta. In his



## WILSON.

official capacity he often received the thanks of the govt. of India for reforms in the coinage and other services. He was for many years sec. to the Public Instruction Committee at Calcutta, and was prominent in directing the studies of the Hindu College. He was noted for musical skill and as an amateur actor.

WIL'SON, JAMES, LL.D.: signer of the Declaration of Independence: 1742, Sep. 14—1798, Aug. 28; b. near St. Andrews, Scotland. He was educated in the Universities of Glasgow and Edinburgh; came to this country 1763; was tutor in the Coll., now Univ., of Pennsylvania, and practiced law in Reading and Carlisle with much success. He wrote much for the patriot cause; was a member of the preliminary conventions 1774-5, and of the continental congresses 1775-77, opposing independence even to the month before the Declaration, which, however, he was the first of the Penn. members to sign. He was on the most important committees, and 1775 was supt. of one of the three Indian departments. As col. he had part in the N. J. campaign of 1776. In 1779 he was advocate-gen. of the French govt., and the same year was mobbed for acting as counsel for tories; in 1782 was commissioned brig.-gen.; and in 1783 and 1785-87 was member of congress, and influential as a federalist in shaping the U. S. constitution, also in framing that of Penn. 1789-90. He was prof. of law in the coll. at Philadelphia from 1790, and associate justice in the U. S. supreme court 1789 till his death in Edenton, N. C. His works in 3 vols. were published 1803-4 by his son, the Rev. Bird Wilson. With Thomas McKean, he was author of *Commentaries on the Constitution of the United States* (1792).

WIL'SON, JAMES GRANT: soldier and author: b. Edinburgh, Scotland, 1832, Apr. 28; son of William W., poet, who removed from Scotland to Poughkeepsie 1833, at which city the son was educated in the collegiate school, and became a partner in a book business with his father. In 1855 he removed to Chicago, where he published the first literary paper in the northwest. He was maj. and acting col. of the 15th Ill. cavalry 1862, and had part in many actions, including those around Vicksburg. The next year he was col. of the 4th regt. colored cavalry at New Orleans, and on the staff of the dept. commander two years, participating in the Red river and other expeditions. Brevetted brig.-gen., he commanded at Port Hudson. Since the war he has resided in New York, engaged in literary pursuits, been honored as delegate to Prot. Episc. diocesan and general conventions, as mem. of the board of visitors to West Point and Annapolis academies, chairman of the Garfield monument committee, and pres. or honorary mem. of genealogical, biographical, historical, and reform societies. Besides many addresses and magazine articles, he has published biographies of Ill. officers; *Love in Letters* (1867); *Life of Gen. U. S. Grant* (1868, enlarged 1885); *Life and Letters of Fitz-Greene Halleck* (1869); *Sketches of Illustrious Soldiers* (1874); *Poets and Poetry of Scotland* (2 vols. 1876); *Centennial Hist. of the Diocese of*



## WILSON.

*New York* (1886); *Bryant and His Friends* (1886); *Appletons' Cyc. of Amer. Biog.* (6 vols. 1886-9); *Com. Isaac Hull and the Frigate Constitution* (1889).

WILSON, JAMES HARRISON: soldier: b. Shawneetown, Ill., 1837, Sep. 2. He was educated at McKendree Coll., and at West Point, graduating 1860. As topographical engineer he served in Or., and 1862 in the Port Royal and Fort Pulaski operations; as aid to Gen. McClellan in the battles of South Mountain and Antietam; as lieut.-col., chief engineer, and inspector-gen. in the Tenn. army and the siege of Vicksburg; as capt. in the regular army and brig.gen. of vols. in the actions near Chattanooga and Knoxville 1863; as cav. division-commander in the Va. operations under Gen. Sheridan; and at the head of the cav. corps of 15,000 men in the campaigns of Gens. Thomas and Sherman in Ga. and Ala. In less than a month he took 5 fortified towns, 288 guns, and 6,820 prisoners, including Jefferson Davis. He was on duty in the improvement of the Miss. river 1866, having been promoted lieut.col. and brevetted maj.gen. in the regular army for gallant service in the war. Retiring 1870, he engaged in engineering enterprises. He commanded a division in Porto Rico 1898, and was military gov. of that island; commanded a department in Cuba; served as second in command in relief of Pekin 1900; represented the army at the coronation of Edward VII. He published *China—Travels and Investigations* (1887); *Life of Andrew J. Alexander* (1887); and, with Charles A. Dana, *Life of Gen. U. S. Grant* (1868).

WILSON, JOHN: colonist and first pastor of the First Church (Congl.) in Boston: 1588-1667, Aug. 7; b. Windsor, England; son of Dr. William W., prebendary of St. Paul's, etc., and grandnephew of Sir Thomas W., sec. of state to Queen Elizabeth. He was educated at Eton and Cambridge; studied law; was preacher of the established church; and was more than once disciplined for his Puritanical opinions. With others of his parish at Sudbury, he sailed with the Mass. colony of John Winthrop, 1630; preached in the open air at Charlestown; and organized the First Church in Boston, of which he was pastor until his death, surviving his colleagues, John Cotton and John Norton. He was chaplain of a force sent against the Pequots, and made missionary visits with John Eliot to the Indians. Firmly orthodox, as shown in his contest with the Anne Hutchinson party, he was beloved for his geniality and kindness. He published *Some Helps to Faith* (London 1625); a poem entitled *Famous Deliverances of the English Nation* (1626); a Latin poem in honor of John Harvard; and *The Day Breaking, if not the Sun Rising, of the Gospel with the Indians in New England* (1647, republished 1865).

## WILSON.

WILSON, JOHN; famous as Professor Wilson, and as the CHRISTOPHER NORTH of *Blackwood's Magazine*: 1785, May 18—1854, Apr. 3; b. Paisley, Scotland; son of a wealthy manufacturer. His earlier education he received in the house of Dr. M'Letchie, minister of the parish of Mearns, a wild moorland district in Renfrewshire, the residence of his boyhood, long afterward commemorated in some of his most charming essays. After having been transferred for a time to the Highlands, the love of which became for him a lifelong passion, he was sent to the Univ. of Glasgow, where he remained for four years. In 1803 he went to Magdalen College, Oxford, where he became notable at once for splendor of intellectual gifts, and for supremacy in the various athletic sports. In 1806 appeared his Newdigate prize poem, *On the Study of Greek and Roman Architecture*; 1807 he took his degree B.A.; 1810, M.A. Meantime he had left Oxford, and settled in Cumberland, attracted partly by the beauty of the Lake Country, partly by a desire to cultivate the intimacy of Wordsworth, of whose genius he was an admirer. He purchased the lovely little property of Elleray. Besides Wordsworth there were in the district Southey, De Quincey, and Coleridge (to whose *Friend* he contributed some essays), with all of whom he became intimate. In 1810 he married Jane Penny, of Liverpool; and in this union found the main happiness of his life. In 1812 he published his poem *Isle of Palms*; and 1816 *The City of the Plague*. The true field of his genius, however, was found on the starting, 1817, of *Blackwood's Magazine*. Some years previously, a pecuniary disaster had befallen him; the fortune of £30,000 left him by his father being so seriously curtailed by the misconduct of a relative as to necessitate the breaking up of his establishment at Elleray: he had therefore removed to Edinburgh, where, 1815, he was called to the Scottish bar; but it does not appear that he had any practice. Having spare time on his hands, he with his friend Lockhart, in similar case, proffered their aid to Blackwood. The publisher rightly estimated the value of their alliance; and during the earlier years of *Blackwood's* Lockhart and W. were the soul of the success of the magazine. Presently Lockhart was withdrawn to succeed Gifford as editor of the *Quarterly Review* in London; and W., though never in any strict sense the editor—Blackwood himself throughout exercising a severe control—became, in the eye of the public, more and more identified with the magazine: to all intents for many years he *was* editor, and under his famous pseudonym of Kit North swayed the magazine before the world. In 1820 he was appointed to succeed Dr. Brown as prof. of moral philosophy in the Univ. of Edinburgh, his friend, Sir W. Hamilton, being one of the defeated candidates. His real claims to such a post, though not to be compared with those of Hamilton—who at that time, however, had not made his ability widely known—have been somewhat unduly depreciated. They were not depreciated by Hamilton himself, whose opinion, as reported by De Quincey, was that ‘Wil-



son's philosophic subtlety of intellect was not the least wonderful of his many wonderful gifts.' As a professor, though somewhat desultory in his methods, he had immense power of stimulating the enthusiasm of his students. Out of his class-room, however, he but indifferently maintained the conventional proprieties of his position. He was the most 'muscular' of 'Christians;' and on more than one occasion the singular spectacle was exhibited of a Scotch prof. of moral science taking off his coat in a public market-place to inflict personal chastisement on some ruffian whose obnoxious conduct had disturbed his moral sense. Though sedulous and strict in his discharge of his duties as a professor, W. was loyal in his adhesion to Blackwood; and his contributions to the magazine were of such amount as to form the main part of his activity. In 1840 he suffered an irreparable loss in the death of his wife. His grief for a while nearly prostrated him, and seems to have shadowed the remainder of his life. He contributed to *Blackwood* more intermittently; and 1842 he published as *The Recreations of Christopher North*, a selection, in two volumes, from the mass of his essays furnished to it. During the session 1852-3 he was smitten by an attack of paralysis, which permanently incapacitated him for professorial duty; and he died in Edinburgh 1854. During his last years he had a pension of £200 a year from government, in acknowledgment of his literary services. He published 1822 a volume of sketches, *Lights and Shadows of Scottish Life*; and 1823 his tale, *Margaret Lyndsay*. In his miscellaneous prose essays, critical and descriptive, especially in the celebrated series of dialogues *Noctes Ambrosianæ*, his true power and genius are revealed. Of the genius there can be little question; though as to whether it embodied itself in forms likely to be permanent, difference of opinion is possible. The materials for judgment are before the world in the collected (or rather selected) ed. of his *Miscellanies*, published since his death by his son-in-law, Prof. Ferrier. As a magnificent *potentiality*, W. may rank with Burns and Scott: at least, nearly as effectually as they did, he captured the heart of the Scottish people, and became, in his later years—the Great Novelist being gone—their accepted literary representative. That he should leave no work sacred as his literary *monument*, was almost involved in the conditions under which he wrote. Writing from month to month for the instant purpose of the hour, full and steady concentration of his energies became more and more difficult. But his *range* of power is extraordinary: from the nicest subtleties of feminine tenderness, he passes at will to the wildest animal riot and the most daring grotesqueries of humor; and in what he terms 'numerous prose,' the prose poem or rhapsody, he may be held, in his finer passages, to be at this day unrivalled.—See the affectionate and felicitous *Memoir* by his daughter, Mrs. Gordon (1863). A selection from the *Noctes Ambrosianæ*—*Comedy of the Noctes Ambrosianæ*—by J. Skelton, appeared 1876.



## WILSON.

WILSON, JOHN, D.D., F.R.S.: missionary, orientalist, and for many years one of the most influential Englishmen in Bombay: 1804, Dec. 11—1875, Dec. 1; b. Lauder, in Berwickshire. Educated at Edinburgh Univ., he was ordained, and went 1828 to Bombay as a missionary; there laboring zealously from 1843, in connection with the Free Church of Scotland, till his death. But his thorough mastery of the languages of w. India, and his knowledge of the literature, history, faiths, and social usages of the various races, with his energy, and his sympathy with native feeling, gave him a wide and powerful influence. He organized the Scottish missions; promoted education, legal reform, toleration, and philanthropic movements; and was repeatedly a trusted political adviser of the gov. and gov. gen. His linguistic labors, especially in Zend, were memorable. As a man W. was loved by all classes and races. He was twice pres. of the Bombay branch of the Asiatic Soc., and was vice-chancellor of the Bombay Univ. Among his writings other than those connected with his missionary work are *The Parsi Religion* (1842); *The Lands of the Bible* (1847); and *India Three Thousand Years Ago*.

WILSON, JOHN LEIGHTON, D.D.: Presbyterian missionary: 1809, Mar. 25—1886, July 13; b. in Sumter co., S. C. He graduated at Union Coll. 1829, and Columbia Theol. Seminary, S. C.; studied Arabic at Andover; was missionary at Cape Palmas, Africa, 1834-42, and on the Gaboon river 1842-53; and then was compelled by ill health to return to this country. At the former station he reduced to writing the Grebo language, embodied it in grammar and dictionary, translated into it portions of the Bible, and printed several small volumes for native use; at the Gaboon station he accomplished the same work for the Mpongwe language; and in both fields organized a church and a school. In 1854 he was appointed sec. of the Presb. foreign mission board, and from the outbreak of the war filled the same office in the Presb. Church, South. A pamphlet by him, largely republished in England, prevented the withdrawal of the British squadron from the African coast, and thus secured the suppression of the slave-trade. He was a contributor to theol. reviews and the Amer. Oriental Soc.'s journal; and pub. *Western Africa, its History, Condition, and Prospects* (1856). He died at Mayesville, S. C.

WILSON, RICHARD: English landscape painter: 1714, Aug. 1—1782, May; b. Penegoes, Montgomeryshire. While studying in Italy 1749 he forsook portrait-painting for landscape; though among his commissions had been full-length portraits of the Prince of Wales and of the Duke of York. In London, 1760, he exhibited his great picture, the *Niobe*, and at once secured rank as one of the first landscape painters of his time. Another celebrated work was his *View of Rome from the Villa Madama*. Failing, however, to hit the popular taste, he fell into the hands of the picture-dealers; and so straitened did he frequently find himself, that 1770 he was glad to obtain the appointment of librarian of the Royal Acad. By the death of a brother, who left him a small property, he was rescued

## WILSON.

from indigence, and retired to Llanferras, in Denbighshire, where he died. After his death his fame greatly increased; and of his numerous pictures, now much prized, many are familiar to the public by engravings; in the National Gallery are three very fine specimens; others form part of the Vernon Collection.

WIL'SON, Sir ROBERT THOMAS: English soldier: 1777-1849, May 9; b. London, where his father was a painter. He was educated at Westminster and at Winchester; and when scarcely 17 years old he joined the 15th light dragoons, then serving in Belgium. In 1798 he was engaged in Ireland in the suppression of the rebellion; afterward he served in Egypt, at the Cape of Good Hope, and in the Peninsula under Wellington; and in 1812 he was attached to the Russian army as English milit. commissioner, during the tremendous struggle which resulted in the capture of Moscow and the pursuit of the doomed French army. At Lützen he took command of the Prussian reserve at a particular crisis of the battle. In 1841 he attained the rank of gen.; and 1842-49 he was gov. of Gibraltar. In 1818 he had been returned to parliament in the liberal interest for Southwark, and he retained his seat till 1831. He died suddenly in London. His life was published by Murray (London).

WIL'SON, THEODORE DELAVAN: naval constructor: b. Brooklyn, N. Y., 1840, May 11. After apprenticeship in the Brooklyn navy-yard, and three months' service in the 13th N. Y. militia in the civil war, he was engaged at first as carpenter on a blockading vessel, and then as inspector of vessels in repair or construction, 1861-66; as asst. naval constructor at Pensacola and at Philadelphia, and instructor at Annapolis 1866-73; as naval constructor at Portsmouth 1873-82; and as chief of the bureau of construction and repair after 1882. His reputation has been much increased by his designs for vessels of the 'white squadron,' and other recent constructions. The air-ports, bolt-extractors, and other devices invented by him have been generally adopted. He was the first American elected to the Institution of Naval Architects of England. His *Ship-building, Theoretical and Practical* (1873), is a standard text-book. He d. 1896, June 29.

WIL'SON, THOMAS: merchant: 1789, Feb. 5-1879, Sep. 2; b. Harford co., Md. In 1798 his parents, who were members of the Soc. of Friends, removed to Baltimore. At 17 years of age W. entered the house of Thordick Chase, trading with the W. Indies and Spain; and in less than two years became its chief clerk. At 21 the firm of Brown & Wilson was established, and he was for several years its resident partner in S. America. In 1857 he retired from mercantile business. He was a member of the Maryland Colonization Soc., and pres. for many years of the Baltimore Manual Labor School. In the civil war he was loyal to the Union. At his death in Baltimore, he left \$625,000 for charities in Baltimore, among them the Thomas Wilson Sanitarium for the care of sick children in summer.



## WILSON—WILTSHIRE.

WILSON, WILLIAM DEXTER, D.D. LL.D., L.H.D., Prof. Episc. clergyman, and prof. of philosophy; b. Stoddard, N. H., 1816, Feb. 28. He was a graduate of Walpole Acad., and, 1838, of the Harvard Divinity School; but turned from Unitarianism and was ordained in the Prot. Episc. Church; and was rector in Sherburne, N. Y., 1842-50; prof. of moral and intel. philos. in Hobart Coll., Geneva, N. Y., 1850-68; and occupied a similar chair in Cornell Univ. 1868-86, from which date he was emeritus prof., and was dean of St. Andrew's Divinity Sch., Syracuse. Dr. W. published *The Church Identified* (1848); two class-books on logic; *Psychology, Comparative and Human* (1871); *Introduction to the Hist. of Philos.* (1872); *Live Questions in Psychology and Metaphysics* (1877), etc. He died 1900, July 30.

WILSON, WOODROW, PH.D., LL.D.: writer on the science of government: b. Staunton, Va., 1856, Dec. 28; son of Joseph R. W., D.D. He graduated at Princeton 1879, and from the law dept. of the Univ. of Va.; practiced law in Atlanta, Ga., 1882-3; studied hist. and politics at Johns Hopkins Univ. 1883-85; was assoc. prof. of hist. and polit. science Bryn Mawr Coll. 1885-88; prof. of hist. and polit. economy in Wesleyan Univ., 1888-90; of jurisprudence and politics, Princeton Univ., 1890-1902; became pres. of Princeton, 1902. He has published *Congressional Government*; *Division and Reunion*; *Colonies and Nation*; *History of the People of the United States*; etc.

WILT. v. *wilt*: 2d pers. sing. of WILL 2.

WILTON, *wil'tūn*: market-town of Wiltshire, England; at the junction of the Nadder and Wily, affluents of the Avon;  $3\frac{1}{2}$  m. w.n.w. of Salisbury. The new church is a tasteful Romanesque edifice, erected 1844. The principal industry is the manufacture of carpets. It is a station on the Southwestern and Great Western railways. W. is a very ancient town, and was cap. of the Anglo-Saxon kingdom of Wessex, and gave name to Wiltshire. From the 9th c. to 1244 it was busy and prosperous; but in that year the Great Western road was diverted, and the prosperity ended.—Pop. (1871) 8,865; (1881) 8,639; (1891) 5,701.

WILTON-CARPET, n. *wil'tūn-kār'pēt* [from the name of a town in Wiltshire, England]: carpet made like Brussels, except that the wire is flattened instead of being round and has a groove along the upper surface, which acts as a director for the knife by which the loops are cut and the wire liberated.

WILTSHIRE, *wilt'shēr*, or WILTS, *wilts*: county of s.w. England; bounded w. and n. by Somerset and Gloucester; e. and s. by Berks, Hants, and Dorsetshire; 1,354 sq. m. The county is divided into two unequal parts—the plains in the n., and the hill district, which comprises the greater part of south w.; and the separation between these two parts is very nearly that of the main line of the Great Western railway, n.e. to s.w. The plains incline n. to the basin of the Thames, which forms in part the n. boundary, and are



## WILY—WIMAN.

noted for their agricultural capabilities. The surface of this district is checkered with grain-fields and rich pastures; and here the cheeses for which W. is favorably known are produced. The hill district (on the chalk) presents ranges of bleak downs, with deep valleys, and is thinly peopled. On its sheep-walks, it is estimated that 700,000 sheep are pastured. Inkpen Beacon, 1,011 ft. high, at the junction of W., Hampshire and Berkshire, is the nucleus whence proceed the North and South Downs of Surrey and Sussex, and the hills which, running s. through this county, become the North and South Downs of Dorsetshire. Agriculture is in an improved state; and W. bacon is famous. Portland stone is quarried; there is a fine oolite, known as Bath stone; and a Forest Marble yields coarse tiles and flagstones, and often retains in perfect preservation 'the ripple-marks of waves and the foot-prints of crustaceans.' The manufacture of woven goods, carpets and other woolen goods, silks and linens, is carried on at Trowbridge, Wilton, Bradford, Devizes, Westbury, etc. There are iron mines and blast-furnaces at Westbury and Seend, and Swindon is one of the greatest railway workshops in the kingdom. The principal rivers are the Thames, with its tributary, the Kennet; the Bristol Avon (which communicates with the Thames and Severn by the Wilts and Berks canal, and again with the Thames by the Kennet and Avon canal), and the Salisbury Avon, with four tributaries spreading over the whole of south W. W. abounds in early and interesting antiquities: among these are its Druidical temples (see AVEBURY: STONEHENGE), British entrenchments, roads, and villages, barrows (in which beads, rude axes of stone, arrow-heads of flint, and sometimes articles in gold, brass, or iron, have been found), Saxon camps, Roman roads, and Norman castles.—Pop. (1881) 258,967; (1891) 264,969; (1901) 271,372.

WILY, WILINESS, etc.: see WILE.

WIMAN, *wi'man*, ERASTUS: promoter of public enterprises: b. Churchville, Ont., Canada, 1834, Apr. 21. After elementary education, and learning the printer's trade, he was reporter on the *Toronto Globe* newspaper, and afterward commercial editor; 1864-5 he edited the *Trade Review*, Montreal; 1856 he was employed by R. G. Dun & Co. in their mercantile agency, the next year becoming a partner, and later their New York manager. In 1881 he was chosen pres. of the Great Northwestern Telegraph Co. He is a director of the Western Union Telegraph Co., and pres. of the Rapid Transit Co. of Staten Island, where he has his residence. He was instrumental in the passage of a congressional bill for the railroad bridge between Staten Island and New York; in the adoption by the Canadian liberal party, 1888, of their reciprocity policy; and in bringing about the abolition of imprisonment for debt in the state of N. Y. In 1894, he was convicted of forgery on a purely technical charge, but promptly obtained stay of sentence, and in 1896 the indictments were dismissed for lack of any proof of evil intent.

## WIMBLE—WINCEY.

**WIMBLE**, n. *wim'bl* [Dan. *vimmel*, an auger or boring-tool; *vinde*, to turn, to twist: O. Dut. *wemelen*, to turn round, to bore: *gimlet* is from the same root]: a boring-tool turned by a handle; an auger; a gimlet; also, a kind of shell-auger used by miners to remove rubbish from a bore-hole: V. in *OE.*, to bore. **WIM'BLING**, imp. *-bling*. **WIMBLED**, pp. *wim'bl'd*.

**WIMBLE**, a. *wim'bl* [Sw. *vimmla*, to be giddy: Icel. *vim*, giddiness (see also **WHIM**)]: in *OE.*, active; nimble.

**WIMBLEDON**, *wim'bl-don*: suburb of London, on the edge of *W. Common*; in the county of Surrey; 8 m. s.w. of London. The common is an open, gorse-covered heath of 1,000 acres. Here, in July, is the annual meeting of the National Rifle Association; and shooting at the butts is practiced all the year round.—Pop. (1871) 9,087; (1891) 25,758.

**WIMPLE**, n. *wim'pl* [Ger. *wimpel*; Dan. and Sw. *wimpel*, a streamer: Dut. *wimpel*, a streamer, a pendant]: *formerly*, a plaited covering of silk or linen for the neck, chin, and sides of the face, worn as an outdoor covering, now retained only in the dress of nuns: V. to ripple; in *OE.*, to draw down as a hood or veil; to lay or lie in folds.

**WIN**, v. *win* [Dut. *winnen*, to gain, to conquer: Dan. *vinde*; Icel. *vinna*, to perform work, to do something for an end: AS. *winnan*, to struggle, to get by labor]: to acquire by labor or exertion; to obtain, especially by effort; to earn; to gain in competition or contest; to gain by kindness, persuasion, or solicitation; to gain by wagering; to gain over; to gain ground, favor, or influence; to succeed; to gain one's end; to get or succeed in getting, as to *win in* (to get in), to *win up* (to rise or get up). **WIN'NING**, imp.: ADJ. attractive; adapted to please or gain favor: N. in *mining*, the whole series of operations of boring, sinking, excavating, etc., by which any mineral, particularly coal, is procured or won from the crust of the earth. **WIN'NINGS**, n. plu. *-ningz*, earnings; the sums gained by success in competitions or contests. **WON**, pt. pp. *wun*. **WINNER**, n. *win'nér*, one who wins or gains. **WIN'NINGLY**, ad. *-li*, in an attractive or winning manner.—**SYN.** of 'win': to acquire; obtain; gain; attain; accomplish; procure; get.

**WINCE**, v. *wins* [OF. *quinchir*, *guenchir*, to start, to shrink: OHG. *wankon*, to wince, to start aside: Ger. *winken*, to nod (see **WINK**)]: to shrink or start back; to flinch: to twist or turn, under pain or through impatience; to kick or flounce when uneasy, as a horse: N. a shrinking or start back. **WINCING**, imp. *wins'ing*. **WINCED**, pp. *winst*. **WINC'ER**, n. *-ér*, one that winces.

**WINCE**, n. *wins* [the same word as **WINCH** 1]: the dyer's reel upon which the cloth turns while being dyed or transferred from one vat to another.

**WINCEY**, n. *win'si*: a stout fabric with a cotton warp and a woolen weft, much used for dresses for women and children; another name for **LINSEY-WOOLSEY** (q.v.).



## WINCH—WINCHESTER.

WINCH, n. *winch* [AS. *wince*, a reel to wind thread upon: from the same root as *wince* and *wink*]: the bent handle or crank by which a wheel or axle is turned; a windlass; in *mining*, a wheel or axle frequently used to draw water, etc., in a bucket by a rope; a twist or turn; also a dyer's wince.

WINCH, v. *winch* [a form of *wince*]: in *OE.*, to shrink; to wince. WINCH'ING, imp. WINCHED, pp. *wíncht*.

WINCHELL, *wín'chél*, ALEXANDER, LL.D.: geologist: 1824, Dec. 31—1891, Feb. 19; b. North East, Dutchess co., N. Y. He graduated 1847 at Wesleyan Univ., Middletown, Conn.; taught nat. science 1848 at Pennington Seminary. N. J.; was teacher in Ala. 1850-54; and prof. of geology, zoology, and botany in the Univ. of Michigan 1854-73. Meanwhile he was director of the geol. survey of Mich. 1859-61, and again 1869-71, when he resigned the office. He became chancellor of the Univ. of Syracuse, N. Y., 1873, but at the end of the year retired from the chancellorship, and was prof. of geology, zoology, and botany till 1879, in the mean time holding a similar chair in Vanderbilt Univ. 1875-78. He took the chair of geology, and paleontology in Michigan Univ. 1879, and held it till his death. He was author of more than 200 separate contributions to the literature of science. Besides his strictly technical essays and notices, and his official reports on the geology of Mich. and Minn., Dr. W. contributed frequently to popular magazines, and published a great number of books, among them *The Doctrine of Evolution* (1874); *Reconciliation of Science and Religion* (1877); *Preadamites, or a Demonstration of the Existence of Men before Adam* (1880); *Walks and Talks in the Zoological Field* (1886).

WINCHENDON, *wínch'en-don*: town in Worcester co., Mass.; on Miller's river, and on the Boston and Albany and the Fitchburg railroads; 18 m. n.w. of Fitchburg, 36 m. n.-by-w. of Worcester. It is an important manufacturing place, producing large quantities of cotton goods, machinery, wooden-ware, chairs, bobbins, spools, bit braces, and other articles. It has 8 churches, Murdick High School (cost \$100,000), Public Library, New England Home for Orphan and Destitute Children, national bank, savings bank, and 1 weekly and 1 semi-weekly periodicals. Pop. (1880) 3,722; (1890) 4,390; (1900) 5,001.

WINCHESTER, *wín'chës-tér*: town, cap. of Clark co., Ky.; on the Newport News and Mississippi Valley, the Kentucky Central, and the Kentucky Union railroads; 18 m. e. of Lexington. It is in the famous Bluegrass region, and is concerned chiefly with stock-raising, though it has considerable manufacturing and lumbering interests. It contains the co. court-house, high school, several graded schools, 6 churches, and 3 weekly newspapers.—Pop. (1880) 2,277; (1890) 4,519; (1900) 5,964.



## WINCHESTER.

**WIN'CHESTER:** town in Middlesex co., Mass.; on the Boston and Maine railroad; 8 m. n.n.w. of Boston. It is really a residential suburb of Boston, and its chief industry is in connection with leather. It is charmingly laid out and well built; and has a high school and several graded schools, 6 churches, national bank, and 2 weekly newspapers. Pop. (1880) 3,802; (1890) 4,861; (1900) 7,248.

**WIN'CHESTER:** city, cap. of Frederick co., Va.; on the Balt. and Ohio railroad; 32 m. s.w. of Harper's Ferry, 113 m. w.-by-s. of Baltimore, 150 m. n.n.w. of Richmond. It is in a wheat-growing region in the Great Valley of Va.; is substantially built; and contains 15 churches, 4 female seminaries, male high school, 2 nat. banks (cap. \$200,000), 1 state bank (cap. \$50,825), and a hotel. There are several tanneries, flour-mills, iron-foundries, agric. imp., glove, soap, shoe, and cigar factories; and 1 daily and 2 weekly periodicals. As the key to the Shenandoah valley, W. was the scene of important operations during the civil war, was occupied several times by the opposing armies, and was the starting-point of Gen. Sheridan's famous ride (see CEDAR CREEK, BATTLE OF). Pop. (1880) 4,958; (1890) 5,196; (1900) 5,161.

**WINCHESTER**, *win'chës-tër*: city of England, chief town of Hampshire; in the middle of the county, on the Itchen; 66 m. s.w. of London. It consists of one main street, crossed by streets at right angles; and was in early times surrounded by a wall, whose remains are visible. The houses mostly spread over a hill rising from the valley of the Itchen; but the cathedral, and some of the older and more interesting portions of the city, are on level ground close to the river. The Castle-hill is the site of the old castle or royal palace, built in the 13th c. by Henry III.; and of a magnificent hall, whose only remaining portion is used as the county court. About a mile from the town is the famous Hospital of St. Cross, founded 1136 by Henry de Blois, Bp. of W., for the support of 13 poor men, 'decayed and past their strength': a daily dinner is given to 100 others. It was munificently endowed; but its sources of income have been narrowed, and its ancient charters and grants were destroyed during the 13th c. The buildings are still in fair preservation. There is a city library, and a museum containing interesting local antiquities. Charles II. began the erection of a palace here, but it was never finished: the part completed is now used as barracks. The city cross in the High street, dating from the 15th c., is very beautiful in design.—See WINCHESTER COLLEGE.

W. is a famous old city. In tradition, a church is said to have been built here 169; to have been destroyed 266, restored 293, and converted into a 'temple of Dagon' (Wodin) by the pagan Saxons under Cerdic 495. In 635 the polluted church was pulled down, and a new one begun, under the superintendence of Birinus, the first apostle of Wessex; and King Kynegils granted all the land for the space of 7 m. round the city for support of the episcopal seat and the re-established monks. From 674, the succession of bishops of W., of which the celebrated St.

## WINCHESTER COLLEGE.

Swithun (see SWITHUN, St.) was one, continues unbroken. Here most of the Saxon kings of Wessex (see HEPTARCHY) were interred; here also, according to tradition, King Canute hung up his golden crown on the altar after the well-known scene on the sea-shore when the advancing tide refused to retire at his command. No portion of this old cathedral remains, the present one having been built 'from the foundations' by Bp. Walkelin (1070-97). William of Wykeham, bp. of W. 1367-1404, greatly enlarged and beautified the building, and he began the remarkable transformation of the nave from Norman to Perpendicular. The cathedral is 520 ft. long, longer than any other English cathedral, except those of Ely (560 ft.) and Canterbury (525 ft.). Its breadth at the transepts is 208 ft., length of nave 351 ft., height 86 ft.. its low central Norman tower is 150 ft. high. The exterior is disappointing, by lack of decoration, and lowness of the tower; but the interior is magnificent, and contains many objects of the highest interest—e.g., the tomb of William Rufus; bronze figures of Charles I. and James I.; mortuary chests which contained the ashes of a number of W. Saxon kings and bishops, but which were rifled during the civil war; the golden shrine of St. Swithun, with some excellent specimens of sculpture ancient and recent; the tomb of Edmund, son of King Alfred; and the tomb of Izaak Walton. The various architectural styles to be noted are: Early Norman in the crypt and transepts; Early English in the e. isles and chapels behind the presbytery; Decorated in the piers and arches of the presbytery; and Perpendicular in the nave, which, for beauty and grandeur, is rivalled only by York. Besides the cathedral, there are interesting churches in the Transition Norman and Perpendicular styles; and there are many other buildings religious and educational. The industries of W. are unimportant.

W. is the *Venta Belgarum* of the Romans, before whose arrival it was the site of a Brit. city, *Caer-Gwent* (*Gwent*=champaign or down). It became a Roman station, and, as such, was a place of importance, and contained temples of Apollo and of Concord. The Saxons called the town Winte-ceaster. As the capital of Wessex, W. became cap. of England, and even after the Norman Conquest was long a chief royal residence. In 1265, during the barons' war, W. was sacked, and never recovered its commercial prosperity. From the time of Charles II., the town has gradually declined—its chief sources of life and movement being the cathedral and the college.—Pop. (1891) 19,073.

WIN'CHESTER COLLEGE, or SAINT MARY'S COLLEGE; called originally 'Seinte Marie College of Wynechestre': famous school at Winchester, England; founded by William of Wykeham (q.v.). Bp. of W., 1387. The buildings, mostly completed 1393, consist of two quadrangles and a cloister; with recently erected houses for the commoners. Its fine chapel, hall, cloister, etc., are still in good preservation. The foundation consisted originally of a warden, 10 fellows, 70 scholars, a head-master (*infor-*



## WINCING MACHINE—WINCKELMANN.

*mator*), an usher (*ostiarius*) or second master, 3 chaplains, 3 clerks or singing-men, and 16 choristers. By an ordinance which took effect 1857, many long-needed changes were made. The charter (still preserved) was granted by Richard II. 1396, and confirmed by all the subsequent sovereigns, except Mary, down to Charles II. The visitor is the bishop of W., and the warden and two fellows of New College, Oxford, hold an annual 'scrutiny.' The endowment amounts at present to about £15,500 annually. The warden and fellows are the governing body. The pupils are of two classes—foundation scholars and commoners. The *scholars* are elected, between 12 and 14 years of age, by competitive examination; the average annual vacancies being 12, and candidates 100. The scholars are well boarded, lodged, and educated, at the expense of the foundation, having to pay various incidental charges; but tradition rules at W., and many of the quaint old customs of the school, such as dining off wooden trenchers, etc., are still retained. The *commoners*, since the changes in 1857, have averaged about 300 annually; they generally enter between 12 and 15 years of age, remain 3–4 years, and board at their own charges in the houses of the head and other masters. W. College has exhibitions at New College, Oxford, or elsewhere; also scholarships and numerous other prizes. Fagging is permitted to the 18 chief boys, who are called 'prefects.' The monitorial system was established first in this college.

WINCING MACHINE, *wín'sing*:- the reel used by dyers for winding out of their dye-vats long pieces of cloth. The vat is often divided by a partition, and the wincing machine is generally so placed that it will wind the piece of cloth from one compartment to the other, according to the direction given to the handle.

WINCKELMANN, *wínk'èl-man*, Ger. *vínk'kél-mán*, JOHANN JOACHIM: critical expounder and historian of ancient classic art: 1717, Dec. 9—1768, June 8; b. Stendal, Prussia. His parents were poor. He early showed eager desire for knowledge, and by serving as amanuensis to an old and blind rector, contrived to pass through the course at the free school. After studying at a gymnasium in Berlin, he went 1738 as student of theology to the Univ. of Halle, where he remained two years. Conceiving a distaste for theology, he turned to history and literature, and maintained himself as a schoolmaster, till Count von Büнау employed him as secretary in his library at Nothenitz, near Dresden, where he had access to the famous treasures of art accumulated in that city. He also made the acquaintance of Oeser and other eminent artists; and was awakened to enthusiastic study of the theory and history of art. Being thrown into the society of the pope's nuncio, Cardinal Archinto, he was induced, after some hesitation, to become a Rom. Catholic, on a promise of a pension being procured for him, to enable him to proceed to Rome. Thither he went 1755, having published at Dresden a treatise, *Gedanken über die Nachahmung der Griech. Werke*, etc. (Reflections on the Imitation of the



Antique, 1754; new and enlarged ed. 1756). At Rome he studied with the utmost ardor, and every facility was afforded him: also he visited the remains of Herculaneum, Pompeii, and Pæstum; and examined collections of antiquities elsewhere. Soon the Cardinal Albani appointed him his librarian, and he was enabled to prosecute his studies in comfort. The first-fruits appeared in *Anmerkungen über die Baukunst der Alten* (Remarks on the Architecture of the Ancients), printed in Germany 1762; and 1764 the great work of his life, on which he had been long engaged, the celebrated *Geschichte der Kunst des Alterthums* (History of Ancient Art), was issued from the press of Dresden: a supplement appeared 1767. *Monumenti Antichi Inediti*, an elaborate work with plates, appeared 1766.

In 1768 W., by this time famous throughout Europe, set out to revisit Germany. His destination was Berlin; but on reaching Munich, he started to return to Rome. He went by Vienna, where the most flattering attentions were shown him by Empress Maria Theresa: proceeding thence to Trieste, he came to his tragic end at the hands of a fellow-traveller, Francesco Arcangeli, to whom W. incautiously showed some gold coins given him by the empress, and who murdered him in order to plunder his effects. The murderer was presently caught and put to death.

W. was the forerunner of a great movement; he was indeed the founder of scientific archeology; and his influence has been great in all the subsequent literature of the subject. Even at this day, when much of his great *History* has become obsolete, it remains as a work not to be neglected by any student of this branch of æsthetics. The most complete ed. of W.'s works is Fernow, Meyer, and Schultz's (8 vols. new ed. 1828).—See Life of W. by Justi (1866-73).

## WIND.

WIND, v. *wind* [Goth. *vindan*; Icel. *vinda*, to wrap round, to twist: Icel. *vindr*, crooked: Sw. *winda*, to squint: Ger. *winden*, to wind, to turn]: to turn in this direction and in that; to pursue a crooked or devious course; to meander; to twine; to entwine; to warp or become uneven in surface, as from unequal drying; to turn or twist round some fixed object; to turn or move around something; to form into a coil, or ball, either by placing the thing coiled in successive convolutions or folds on something, or by turning that on which they are laid; to enfold; to encircle; to wrap; to entwist; to hoist as with a winch, windlass, or capstan; to adjust by coiling the actuating spring of, as to *wind* a watch; to advance or introduce one's self by stealthy insinuating methods. WIND'ING, imp.: ADJ. bending; twisting from a direct line or an even surface: N. a turning; a bending first one way and then another, as a river. WOUND, pt. pp. *wound*. WIND'ER, n. -*er*, one or that which winds; a reel for winding silk or cotton on. WIND'INGLY, ad. -*ly*, in a circuitous form or manner. WIND'ING-SHEET, a sheet or cloth in which a dead body is wound or wrapped. To WIND OFF, to unroll; to uncoil. To WIND OUT, to extricate; to be disentangled. To WIND UP, to bring into a small compass; to roll into a ball or coil; to bring to a final settlement, as the affairs of an estate or company; to put into a state for continuing motion, as a clock; to raise by winding; to raise by degrees: to straiten a string by turning that on which it is entwined.

WIND, n. *wind* [AS., Dut., and Ger. *wind*; Goth. *vinds*; Icel. *vindr*; W. *gwynt*; L. *ventus*, wind]: air in perceptible motion; a current of air having a greater or less degree of velocity; one of the cardinal points, as from the *four winds*; breath; power of breathing; flatulence; anything insignificant or light as wind; hence, something ineffectual or empty; idle words; bombast; 'gas': V. to deprive of breath by overdriving, as a horse; to rest a horse that he may recover his breath; to follow by scent; to nose; to sound by blowing, as a horn, so that the sound may be prolonged [pronounced *wînd*]. WINDING, imp. *wînd'ing* —pronounced *wînd'ing* when applied to the prolonged blast of a wind-instr., as a hunting-horn. WINDED, pp. *wînd'ed*. WINDED, pp. *wînd'ed*. WOUND, pp. *wound*, said of a horn. WIND'Y, a. -*y*, pertaining to or consisting of wind; next or exposed to the wind; abounding with wind; airy; tempestuous; flatulent; empty. WIND'INESS, n. -*ness*, state of being windy; tendency to generate wind; flatulence. WIND'AGE, n. -*age*, in a *gun*, the space between the ball and the bore, being the difference between the diameter of the bore and that of the-shot. Formerly the difference allowed was considerable, but this served only to diminish the force of the explosion and to give an irregular motion to the projectile. Some windage is indispensable, in order to permit some portion of the explosive gas to escape and to prevent friction; and in rifled artillery it is sought to reduce it to a minimum, say .01 of an inch. The term *windage* is used also for the effect of the wind in deflecting a missile or projectile in its flight toward the point aimed at, as well as the amount

## WIND.

of such deflection, or the allowance made for it in taking aim; the rush of air which accompanies or is produced by a shot; a contusion produced by such a rush of wind; Wind Contusion (q.v.). WIND'LESS, a. -lēs, wanting wind; out of breath. WIND'WARD, n. -wērd, the direction from which the wind blows: ADJ. on the side toward the direction from which the wind blows: AD. toward the wind. WIND'-BAG, an incessant frivolous talker. WIND'BOUND, prevented from sailing by a contrary wind, binding or restraining the ship to the harbor, river, or roadstead. WIND'-BROKEN, affected by disease in the breathing, as a horse. WIND'-EGG, an egg said not to contain the principles of life; properly, an egg laid without a shell. WIND'FALL, fruit blown off a tree by wind; any unexpected gain or advantage, as a legacy. WIND'-FLOWER, the Anemone (q.v.). WIND'-GAUGE, an instr. for ascertaining the velocity and force of the wind; an anemometer. WIND'-GALL, soft tumor on the fetlock-joints of a horse, and sometimes of other animals, resulting from irritation and inflammation within the delicate synovial cavities, which thus secrete an unusual quantity of thickened synovia. Wind-galls are caused by strains, overwork, or fast driving. Though not always causing lameness, they make the affected animal unsound. Remedial measures are rest, rubbing, bathing with cold water or astringent lotions, and the use of bandages. A spring truss so arranged as to bring pressure directly on the swelling sometimes proves beneficial. Blistering, often resorted to, is not to be recommended. WIND'-HOVE, among cattle, the inflation of the stomach by wind: see HOVEN (under HOVE). WIND'-INSTRUMENT, a musical instr. played by means of the breath, as a flute, or by artificial currents of air, as an organ (see below). WIND'MILL, a mill driven by the wind (see below). WIND'PIPE, the passage for the breath to and from the lungs; the Trachea (q.v.). WIND'-ROSE, the thirty-two points of the mariner's compass, having the appearance of a rose; an account of the mean pressure of the air from the various points of the compass. WIND'-SAIL, a wind-tube or funnel of canvas for conveying a stream of air into the lower apartments of a ship. IN THE WIND'S EYE, in the direct point from which the wind blows. BETWEEN WIND AND WATER, in that part of a ship's side or bottom which is frequently brought above the water by the rolling of the ship or by the fluctuating of the water. DOWN THE WIND, in the direction of and moving with the wind. THREE SHEETS IN THE WIND, in *slang*, partially intoxicated. TO BE IN THE WIND, to be in secret preparation; to be within the reach of suspicion, though not announced or acknowledged; to be rumored or talked of, though not publicly announced. TO WIND A SHIP, to turn it completely so that the wind may strike it on the opposite side. TO CARRY THE WIND, to toss the nose as high as the ears, as a horse. TO RAISE THE WIND, to procure money. TO TAKE OR GET WIND, to be divulged; to become public. TO TAKE OR HAVE THE WIND, to gain or have the advantage. TO TAKE THE WIND OUT OF ONE'S SAILS, to circumvent, coming, as it were, between the wind and another; to bring down. To



## WIND.

SAIL CLOSE TO THE WIND, to sail as nearly against the wind as possible; hence, figuratively, to be as dishonest as one conveniently can.—SYN. of 'wind, n.': breeze; blast; gale; gust; squall. *Note*.—In *poetry* it is to be noted that *wind* is usually pronounced *wīnd*.

WIND: air in motion. Winds vary in force as they vary in direction. The direction of wind may be shown by the Weather-cock (q.v.), its velocity and pressure by the Anemometer (q.v.). Wind with a velocity of 7 m. an hour is a gentle air; of 14 m. an hour, a light breeze; 21 m., a steady breeze; 40 m., a gale; 60 m., a heavy storm; and 80 to 150 m., a hurricane sweeping everything before it. A wind with a velocity of 5 m. an hour has a pressure of 2 oz. on the sq. ft.; 10 m.,  $\frac{1}{2}$  lb.; 20 m., 2 lbs.; 30 m.,  $4\frac{1}{2}$  lbs.; 40 m., 8 lbs.; 51 m., 13 lbs.; 60 m., 18 lbs.; 70 m., 24 lbs.; 80 m., 32 lbs.; and 100 m., 50 lbs. In the Tay Bridge storm (1879, Dec.) the cyclone travelled 40 to 70 m. an hour, the velocity of some gusts reaching from 96 to 150 m.

Seamen more than landsmen need to give attention to every variation in the strength of the wind, as well as its direction; and the *Anemometer* (q.v.), used on land for this purpose, is unsuited to the wants of seamen. They have found it convenient to divide winds into 12 kinds, in relation to strength, designated thus: *faint air*, *light air*, *light breeze*, *gentle breeze*, *fresh breeze*, *gentle gale*, *moderate gale*, *brisk gale*, *fresh gale*, *strong gale*, *hard gale*, *storm*. This estimate of the wind's force on the scale 0 to 12, means that 0 represents a calm, and 12 a hurricane. If such estimations be divided by 2, and the quotient squared, the result will be approximately the pressure of the wind in lbs. weight.

All wind is caused, directly or indirectly, by changes of temperature. Suppose the temperature of two adjacent regions to become, from any cause, unequal, the air of the warmer, being lighter, will ascend and flow over on the other, while the heavier air of the colder region will flow in below to supply its place. Thus, a difference in the temperature of the two regions gives rise to two currents of air—one blowing from the colder to the warmer along the surface of the earth, and the other from the warmer to the colder, in the upper strata of the atmosphere; and these currents will continue till the equilibrium be restored.

Winds are classed as *Constant*, *Periodical*, and *Variable Winds*.

CONSTANT WINDS are usually called *Trade-winds*.—When the surface heated is, roughly speaking, a whole zone, as in the case of the tropics, a surface-wind will set in toward the heated tropical zone from both sides, and uniting will ascend, and then, separating, flow as upper currents in opposite directions. Hence, a surface-current will flow from the higher latitudes toward the equator, and an upper current toward the poles. If, then, the earth were at rest, a north wind would prevail in the n. half of the globe, and a south wind in the s. half. But these directions are modified by the rotation of the earth

on its axis from w. to e. In virtue of this rotation, objects on the earth's surface at the equator are carried round toward the e., at the rate of 17 m. a minute. But as we recede from the equator, this velocity is continually diminished; at lat.  $60^{\circ}$ , it is only  $8\frac{1}{2}$  m. a minute, or half of the velocity at the equator; and at the poles it is nothing. A wind, therefore, blowing along the earth's surface to the equator, is constantly arriving at places which have a greater velocity than itself. Hence, the wind will lag behind—that is, will come up against places toward which it blows—i.e., will become an *east* wind. Since, then, the wind n. of the equator is under the influence of two forces—one drawing it s., the other drawing it w.—it will, by the law of the composition of forces, flow in an intermediate direction, that is, from n.e. to s.w. Similarly, in the s. tropic, the wind will blow from s.e. to n.w. All observation confirms this reasoning. From the great service that these winds render to navigation, they have been called the Trade-winds. It is only in the Pacific and Atlantic Oceans that the trade-winds have their full scope. In other parts of the trades' zone, such as s. Asia and intertropical Africa and America, they are more or less diverted from their course by the unequal distribution of land and sea (see MONSOON). It is generally stated that in the Atlantic the *North Trades* prevail between lat.  $9^{\circ}$  and  $30^{\circ}$ , and in the Pacific between lat.  $9^{\circ}$  and  $26^{\circ}$ ; and the *South Trades* in the Atlantic between lat.  $4^{\circ}$  n. and  $22^{\circ}$  s., and in the Pacific between lat.  $4^{\circ}$  n. and  $23\frac{1}{2}^{\circ}$  s. These limits, however, are not stationary, but follow the sun, advancing n. from Jan. to June, s. from July to December.

*Region of Calms.*—This is a belt,  $4^{\circ}$  or  $5^{\circ}$  broad, stretching across the Atlantic and Pacific, parallel to the equator. It marks the meeting-line of the n. and s. trades, where they neutralize each other. Here also occur heavy rains, and almost daily thunder-storms. This belt varies its position with the trades, reaching its most n. limit in July, and its most s. in Jan. When the belt of calms nears the African coast, in the Gulf of Guinea, the copious rainfall gives rise to the strong steady gales of that coast, called *Tornadoes*.

**PERIODICAL WINDS.** *Land and Sea Breezes.*—These are the most general, as well as most easily explained, of the periodical winds. On the coast, within the tropics, a breeze sets in from the sea in the morning, at first a mere breathing on the land; but gradually it increases to a stiff breeze in the heat of the day, after which it sinks to a calm toward evening; soon afterward a contrary breeze springs up from the land, blows strongly seaward during the night, and dies away in the morning, giving place to the sea-breeze as before. These winds are caused during day, by the land becoming more heated than the sea, when, consequently the air over it ascends, and the cool air from the sea flows over on the land to supply its place; and during night, by the temperature of the land falling below that of the sea, and the air becoming thereby heavier and denser, flows over the sea as a land-breeze. Within the tropics,



## WIND.

sea-breezes are most marked and constant, because there the sun's heat is greatest, and atmospheric pressure is practically uniform, except in the rare instances of its disturbance by hurricanes. Quite analogous to the land and sea-breezes are the Monsoons (q.v.), which are only the n. trades drawn out of their course in summer by the heated regions of s. Asia—the s.w. monsoon being only a vast sea-breeze blowing on s. Asia and continuing several months of the year.

VARIABLE WINDS.—These are characteristic of zones beyond those of the trade-winds, and in general result from the commingling of the cooled and descending anti-trade-winds (the upper current from the equator to the poles) and the surface currents from the north, which, except for this commingling, would have the regular character of trades. But the variableness is continually modified by the great cyclonic movement of storms toward which the winds centre. Besides this, winds are affected more or less by purely local or temporary causes, such as the nature of the ground, covered with vegetation or bare; the physical configuration of the surface, level or mountainous; the vicinity of the sea or lakes, etc. Within the tropics, all these are borne down, or almost borne down, by the great atmospheric currents, which prevail there in all their force. But in higher latitudes this is not the case; these, therefore, are the regions where variable winds prevail. The term variable may be applied also to periodic winds characteristic of certain countries. The most noted of variable winds are the Simoom (q.v.), Sirocco, Solano, and Harmattan (q.v.). The *Bora* is a cold tempestuous wind, blowing from the Alps down on the Adriatic; and the *Gregale* is a peculiarly cold, parching, and unhealthful wind, which at certain seasons descends on Malta from Greece. The *Puna Winds* prevail four months in the year in a high barren table-land in Peru called the Puna; as they are part of the s.e. trade-wind, after having crossed the Andes they are drained of their moisture, and are consequently the most dry and parching winds that occur anywhere on the globe. In travelling over the Puna it is necessary to protect the face with a mask from the glare and heat of the day and from the intense cold of the night. The *Etesian Winds* are n. winds which prevail in summer on the Mediterranean, caused probably by the great heat of n. Africa at this season, and consist in a general flow of the air of the cooler Mediterranean to the s., to take the place of the heated air which rises from the sandy deserts. The *Mistral* is a steady, violent n.w. wind, felt particularly at Marseilles and in s.e. France, blowing down on the Gulf of Lyons. The *Pampero* blows in the summer season from the Andes across the pampas of Buenos Ayres to the sea-coast: it is thus a n.w., or part of the anti-trade of the s. hemisphere, and so far analogous to the stormy winds which sweep over Europe from the s.w. But since it comes from the Andes over the S. Amer. continent, it is a dry wind, frequently darkening the sky with clouds of dust, and drying up vegetation.



## WIND CONTUSION—WINDERMERE.

Lord Bacon remarked that the wind most frequently veers with the sun's motion, or passes round the compass in the direction of n., n.e., e., s.e., s., s.w., w., and n.w., to n. This is from the fact that by far the greater proportion of the storms of n.w. Europe follow their course to eastward along paths lying n. of the Brit. Islands. Prof. Dove of Berlin first propounded the *Law of the Rotation of the Winds*, and proved that the whole system of atmospheric currents—constant, periodical, and variable winds—obeys the influence of the earth's rotation.—See METEOROLOGY: STORMS: CYCLONE: ETC.

**WIND CONTUSION:** contusion, such as the rupture of an internal organ or the concussion of the brain, or even a comminuted fracture of a bone, caused or supposed to be caused by the rush of air produced by a cannon-ball or other projectile in its flight. Military surgeons so often meet with such cases of injury without any external marks of violence to indicate the stroke of a cannon-ball, that they have been led to the conclusion that solid objects projected with great velocity through the air might inflict such injuries by aërial percussion; the hurt being inflicted either directly by the force with which the air is driven against the part, or indirectly by the rush of air to refill the momentary vacuum created by the rapid passage of the ball. So many observations have, however, been made of cannon-balls passing close to the body (even shaving part of the head, tearing away portions of uniform, or carrying off the external ear or the end of the nose, without further mischief), that this hypothesis is totally untenable, and is now generally rejected. The true explanation of such cases is now thought to rest 'in the peculiar direction, the degree of obliquity with which the missile impinges on the elastic skin, together with the situation of the structures injured beneath the surface, relatively to the weight and momentum of the ball on one side, and hard resisting substances on the other.' See 'Gun-shot Wounds' in Holmes's *System of Surgery*, II. 18-20.

**WINDERMERE**, *wîn'dér-mēr*, or **WINANDERMERE**, *wîn'an-dér-mēr*, or **LAKE WIN'DER**: largest lake in England; sometimes called the 'Queen of the Lakes,' on account of its great natural beauty. It is partly in the county of Lancaster, and partly divides that county from Westmoreland. It is 11 m. long, and about 1 m. in extreme breadth; is fed by the Brathay and the Rothay, whose waters unite before entering the lake; also by the streams which drain the neighboring lakelets of Esthwaite, Troutbeck, and Blelham. It discharges its surplus waters s. into Morecambe Bay by the Leven. Next to Wast Water, W. is the deepest of English lakes, its greatest depth being 240 ft., while Wast Water is 270 ft. deep. It contains a number of islands, the largest covering 28 acres. The chief are Rough Holm, House Holm, Lady Holm, and Curwen's or Belle Isle. The scenery is characterized not by wildness and sublimity, but by soft, rich beauty. About 1 m. from Waterhead, at the n. extremity of the lake, is the town of Ambleside, 1½ m. n.w.

## WINDHAM.

of which is Rydal, residence of the poet Wordsworth: in the vicinity of Waterhead is Dove's Nest, the cottage at one time occupied by Mrs. Hemans; further down the e. shore is Elleray, residence of 'Christopher North' (see WILSON, JOHN); and half-way down the lake, on the e. shore, is Bowness.



Lake Windermere, from Elleray.

WINDHAM, *wind'am*, The Right Hon. WILLIAM, D.C.L.: English statesman: 1750, May 3—1810, June 4; b. in Golden Square, London; son of Col. William W., of Felbrigg Hall, Norfolk, in which county the family had been settled since the 12th c. He was educated at Eton, and at Glasgow Univ., where he studied mathematics with success. In 1761 he entered at Univ. College, Oxford. After the usual course of travel, he began to acquire notoriety as an opponent of the administration of Lord North, especially by his first speech 1778 in vehement opposition to the war with the Amer. colonies. In 1781 he was returned to parliament for Norwich, and took his seat among the whigs. In 1783, on the formation of the Portland ministry, W. became principal sec. to Lord Northington, lord-lieut. of Ireland. Before leaving England, he called upon his friend Dr. Johnson, and lamented that his situation would compel him to sanction practices that he could not approve. 'Don't be afraid, sir,' replied the doctor; 'you will soon make a very pretty rascal.' He soon resigned his secretaryship. In 1784 he abandoned his old friends the whigs, and followed Burke, ranging himself on the side of Pitt against the speculative doctrines of the French Revolution, and supporting the war with France. In 1794 he became sec.-at-war under Pitt, with a seat in the cabinet. He went out with Pitt 1801; but on the return of the Grenville party to power, he became colonial sec. In 1806 he brought forward his plan of limited service in the army, passed into a law. He went out of office 1807, when the Portland administration was formed (having



## WIND-INSTRUMENTS.

previously declined a peerage), and strongly denounced the expedition against Copenhagen. In May he underwent a surgical operation for extracting a tumor from his hip, which had resulted from an injury at a fire where he was assisting: from the effects of the operation, he died.

W. was an excellent speaker, and one of the most effective and skilful debaters of his time (see his speeches collected by Amyott, with Life prefixed, 3 vols. 8vo. 1806). Fox said he had never met a meditating man with so much activity, or a reading man with so much practical knowledge. Pitt declared that his speeches were the finest productions possible of a warm imagination and fancy. Canning described his eloquence as, if not the most commanding, at least the most insinuating ever heard in the house of commons. Dr. Johnson was much attached to him, and admired his literary gifts. He had brilliant conversational powers. Yet he appears in history as the shadow of a man. He was fond of paradox, and once defended bull-baiting in the house of commons with great vivacity and ingenuity. Athletic exercises were his delight. Although not without refinement and sensitiveness, he had a passion for pugilism, and was a regular attendant on prize-fights. The publication of his *Diary from 1784 to 1810*, by Mrs. Henry Baring (1866), discloses the secret of his weakness. Morbidly self-conscious, he was always watching himself, pulling himself to pieces, and recording the doubts that haunted him as to his mental capacity. His rare powers were always in fetters; he was an intellectual hypochondriac.

**WIND-INSTRUMENTS:** musical instruments in which the sounds are produced by agitation of an inclosed column of air. They are classified into *wood instruments* and *brass instruments* (both played by the breath), and the *organ*.

The name *wood instruments* includes those made of ivory. The principal *wood instruments* are the flute, piccolo, clarinet, flageolet, basset-horn, oboe, and bassoon. They are generally characterized by a soft, smooth, aerial tone, resembling the human voice. By the use of holes and keys, considerable compass is given to them; they are capable of producing only one sound at a time, but with considerable command of piano and forte. Of *brass instruments* the chief are the horn, trumpet, trombone, cornet-a-piston, euphonium, bombardon, and ophicleide. They are generally more powerful, and their quality more piercing than wood instruments; the ophicleide, however, approaching more than the rest to wood instruments in capabilities and tone. In a full orchestra there are generally two flutes, two oboes, two clarionets, two or four horns, and two bassoons, frequently with the addition of two basset-horns, one or two piccolos, and one or two ophicleides or trombones. Each part, except when there is an unusually large number of bow-instruments, is single.

The Organ (q.v.) is a combination of a large number of wind-instruments, sounded, not by the breath, but by admission of air into the wind-chest, by means of keys pressed down by the performer.



## WINDLASS.

**WINDLASS**, *n.* *wind'las* [Icel. *vindass*, a windlass—from *vinda*, to wind, and *ass*, a pole: Dut. *windas*, a windlass—from *winden*, to wind (see **WIND** 1)]: a machine for raising heavy weights, being a modification of the *wheel and axle*; in *OE.*, the handle by which anything was turned; a kind of winch used in bending a cross-bow: also, a circuit or circuitous path; hence, wile; trickery.—The *Windlass* in its simplest form consists of an axle supported by pivots on two strong upright pieces, and pierced near one end with four or six square holes, into which handles, known as *hand-spikes*, are

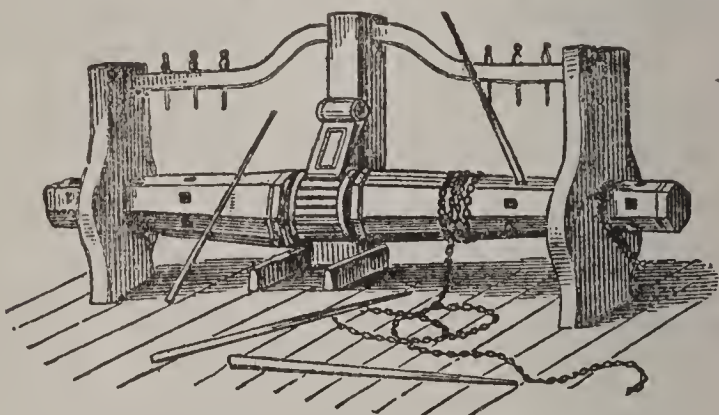


Fig. 1.—Ship's Windlass.

inserted. In other forms, a Winch (q.v.) at each end is substituted for the handspikes. If the weight (say a bucket of water) is to be lifted a considerable distance, the length of the rope which attaches it to the axle largely increases the weight, and thus aids the power when descending, and counteracts it when ascending. This difficulty is partially overcome by employing a double rope with two buckets, one of which ascends while the other descends; but this modification, though partially effective for the end in view, lends aid to the power when aid is least required, and hinders it when aid is most required. A more efficacious plan is to form the axle not cylindrical, but of a barrel-shape, like two truncated cones placed base to base, and to fasten two ropes, one to each end, so that when coiled up around the barrel they approach the middle; in this case, when one rope is fully uncoiled, and winding up commences, the gross weight, which is then at its maximum, acts at the minimum leverage of the end, and as the progress in winding up diminishes the weight, its leverage so increases that the momentum is preserved uniform. On the other hand, the empty bucket, as it begins to descend, acts at its greatest leverage, and as the unwinding of the rope adds to the weight, its leverage becomes smaller, so that the momentum of the descending weight always remains the same; thus the strain on the power is preserved uniform. It is sometimes found necessary greatly to increase the ratio of the weight to the power; but with the ordinary windlass this could be effected only by similarly increasing the ratio between the leverage of the handle and the radius of the axle—an object attained by a great increase of the former, render-

ing the machine too cumbrous; or by greatly diminishing the latter, and so weakening it. The desired result is attained, however, in a manner not liable to these objec-



Fig. 2.

tions, by the use of the *differential axle* (fig. 2), an axle of which one half is of greater diameter than the other, and the single rope, after being coiled round the whole axle from end to end, is fastened at each end of the axle, and the weight is hung by a pulley, which is supported in a bulge in the centre of the rope. As the portion of the rope on one half of the axle is unwound, that on the other half is wound up; but

since the rates of winding and unwinding are different, the bulge of the rope increases when the rope is wound *on* the smaller end of the axle, and decreases when it is wound *off* the smaller end. The more nearly equal the two radii of the axle are, the greater is the weight which can be raised by the power—the ratio between the two being

$$\frac{W}{P} = \frac{\text{radius of circle described by power}}{\text{difference of radii of the portions of the axle}}$$

so that if the radius of the power is 18 in., and the radii of the axle are 5 and 4 in., the power balances a weight = 18 times itself; while the strength of the axle requires to be equal only to that of one of the ordinary kind, in which the power can balance a weight only =  $4\frac{1}{2}$  times itself. The same principle is applied to the Screw (q.v.). For a very accurate estimate of the mechanical advantage of the windlass, the thickness of the rope must be taken into account, by adding half its diameter to the radius of the axle.

**WINDLE-STRAW**, n. *wîn'dl*- [*straw* for *winding* or *plaiting*]: a stalk of tufted hair-grass, dog's-tail, or other grass, when old and dry.

**WIND'MILL**: mill for grinding, sawing, pumping, or for performing any other species of work in which fixed machinery can be used—the motive-power being the wind acting on a set of sails. The structure is a conical or pyramidal tower of considerable height, covered at the top with a species of dome, *aaa* (fig. 1), which is so fastened as to revolve upon it round the upper extremity of the shaft *c*, as a centre, the motion being aided by the interposition of 'castors' between the wooden rings which form respectively the base of the dome and the top of the tower; the sails, *b, b*, are attached to the extremity of the axis *d*, so as to revolve in a plane at right angles to it, and the motion that they communicate to the axis is transferred by the bevelled wheels *e* and *f* to the upright shaft *c*, by which it is in turn conveyed to the working machinery at the bottom of the tower. The axis *d* of the sails, which is inclined at an angle of about  $10^\circ$  to the horizontal, is fixed at one end to a projection from the top of the shaft *c*, and at the other to a circular orifice in the side of the dome, so that it re-

# WINDMILL.

volves with the latter, carrying the sails with it; this arrangement is adopted to enable the plane of rotation of the sails to be placed always at right angles to the direction of the wind. This transference of the plane of rotation was effected formerly by manual labor applied to a winch at

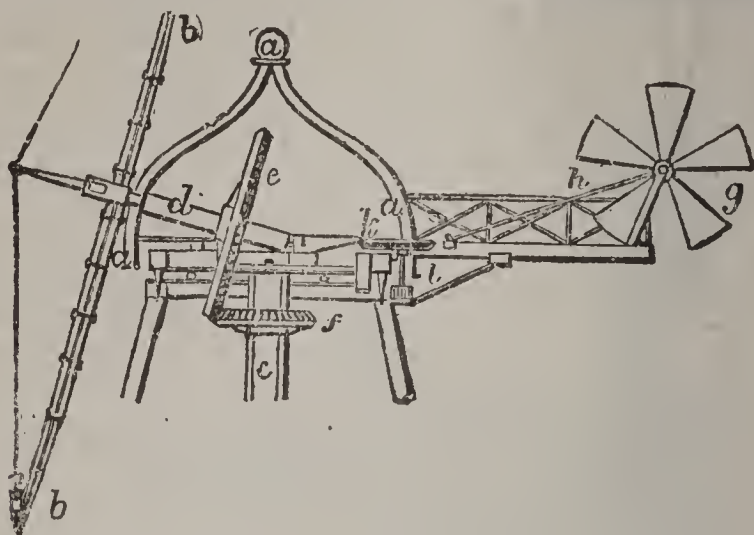


Fig. 1.

the bottom of the tower—the rotation being communicated, by an endless band and wheel-work above, to the dome,

the outer circumference of whose base was, for this purpose, furnished with a circle of rack-work. But this clumsy arrangement was superseded by an ingenious contrivance, by which the wind itself was made to turn the sails into their proper position. The apparatus by which this is effected consists of a revolving *flyer* or fan, *g*, projecting from a gallery fastened to the dome on the side opposite to the sails; *h*, a long thin shaft to which a revolving motion is communicated by a toothed wheel on its outer extremity, from a corresponding wheel on the axis of the flyer (these wheels are not seen in the fig., being behind the flyer); a pinion at the other end of the shaft acts on the cog-wheel *k*, which carries, on the lower extremity of its axis, a pinion *l*, and this last can, at pleasure, be put into gearing with the rack-work or cog-circle on the lower edge of the dome. The construction of the sails, four in number, is shown in fig. 2. Each sail consists of a *whip* or radius 33 to 40 ft. in length, firmly fastened at right angles to the sail-axle, and pierced at from  $\frac{1}{6}$  or  $\frac{1}{7}$  of its length from the axle to its extremity with about 20 holes, into each of which is inserted a cross-bar 5-6 ft. in length; and this frame-work, strengthened generally by light rods connecting the ends of the cross-bars, is then covered with canvas.



Fig. 2.

The cross-bars, however, are not, as in the figure, set in the plane of revolution of the whips, for, in that case, the wind, acting in a direction coinciding



## WINDOM.

with that of the sail-axle, would impinge perpendicularly on the sails, and no rotatory motion would result; the bars, therefore, are set at an angle to this perpendicular direction, yet not all at the same angle, for the velocity of each point of the sail increasing with its distance from the sail-axle, the inclination must vary from the first cross-bar to the outer extremity. It is found that a variation of the angle from  $18^{\circ}$  at the first cross-bar, to  $7^{\circ}$  at the extremity, is a very effective form. The amount of sail that a windmill can carry with advantage is limited, according to some authorities on this subject, to  $\frac{7}{8}$  of the area of the circle described by one whip; the velocities of a sail, when unconnected with, and when producing its maximum effect on, the machinery below, are as 3 to 2; also, the increase of useful effect varies with the square of the wind's velocity, and is proportional to the cube of the length of the whip, in sails of similar form. A windmill with sails of 40 ft. radius is equivalent to 65,000 foot-pounds per minute. Another species of windmill, known as a horizontal wind-mill, is a large circular frame of wood which rotates on a vertical axis, and carries a set of sails which revolve in a horizontal plane. According to Sir David Brewster, the power of a horizontal mill is only about one-third or one fourth of that of a vertical mill, the number and size of the sails being equal in each. An ingenious form of horizontal wind-mill was patented by Giraudat of New York 1861: its peculiarity is in the sails, which are hinged in such a way that the force of the wind acting on one face preserves their perpendicularity to it, and secures a maximum effect, but when, after a further semi-revolution, the other side is presented to the wind, they are raised to a horizontal position. Most of the recent improvements in windmills have had for their object the regulation of the sail-area exposed to the wind to counterbalance the variations in the latter's force, and so produce uniformity of motion; but these are too numerous to be here noticed.—Windmills were introduced into Europe from the Saracens, and were formerly extensively used in England; they are still common in the midland and southern districts; on the continent, especially in Holland and France; and abound in the United States.

WINDOM, *win'dom*, WILLIAM: statesman and financier: 1827, May 10—1891, Jan. 29; b. Belmont co., O. He began to practice law in Mount Vernon, O.; was prosecuting atty. for Knox co. 1852; removed to Minn. 1855; and was mem. of congress 1859–69, with chairmanship of committees on Indian affairs. In 1870 he was appointed U. S. senator to fill a vacancy, was elected senator for the full term 1871–77, and re-elected for the next term, but resigned 1881 to accept the secretaryship of the treasury. On the death of Pres. Garfield, he resigned this office, and by new election filled his own vacancy in the senate. In 1889 he again became sec. of the treasury, under Pres. Harrison. He died suddenly at the conclusion of an able and conservative speech on the national currency, at a dinner given him at Delmonico's, New York. His death was felt to be a great public loss.

## WINDOW.

**WINDOW**, n. *wîn'dō* [Icel. *vindauga*; Dan. *vindue*, a window: literally *wind-eye*, an opening to admit the air: Icel. *auga*, an eye (see **WIND** 2 and **EYE**): an opening in a building, fitted with a frame, in which are placed sashes, usually movable, filled with glass, as in western countries, or covered with paper, as in China, Japan, etc., for the admission of light and incidentally of air; an aperture or opening; a lattice or casement: V. to furnish with windows; in *OE.*, to place at a window. **WIN'DOWING**, imp. **WIN'DOWED**, pp. *-dōd*: **ADJ.** having many openings or rents. **WIN'DOWLESS**, a. *-lēś*, being without windows. **WIN'DOW-BLIND**, a blind, screen, or shade, intended to intercept or modify the sun's rays, or for greater privacy of those within. **WIN'DOW-FRAME**, the frame which receives the sashes. **WIN'DOW-GLASS**, glass used for glazing windows. **WIN'DOW SASH**, the light frame in which panes of glass are set for windows.

**WIN'DOW**: opening in the wall of a building for admission of light and air. In the East, from time immemorial, windows open not on the street, but on the inner court, and are usually provided with lattices or jalousies. The Chinese and Japanese use, instead of window-glass, a thin varnished paper. Among the Romans windows were originally closed with shutters; afterward they were made of a transparent stone, *lapis specularis*, which, from the description, was probably mica; and in the 2d c. after Christ, of horn. According to some, there are traces of glass windows having been used in Pompeii; but this is doubtful. The first indisputable mention of glass windows is by Gregory of Tours, 4th c., who speaks of church windows of colored glass. Wilfrid (q.v.), on succeeding to the bishopric of York 669, filled the vacant windows of the cathedral with glass. In 674 Abbot Benedict Biscop brought artists from France to glaze the windows of the Abbey of Weremouth; and the bp. of Worcester did the same 726. Leo III., end of the 8th c., put glass windows into the Church of the Lateran, Rome. Glass began to be used in windows of private houses in England as early as 1180; in France in the 14th c. As late as 1458, Æneas Sylvius was surprised to find that in Vienna most of the windows were glazed. See **GLASS**.

In ancient temple architecture, windows were unknown—the light being obtained from openings in the roof. In Gothic architecture, the window is one of the most important features, giving, by the infinite variety of its outline and the graceful forms of its tracery, as much character and beauty to the Gothic edifices as the styles and colonnades of ancient art gave to the classic temples.

In the early Gothic or Norman style, the windows were small, and were either simple openings with semicircular head, or two such grouped together with a larger arch over both, and with the usual moldings and ornaments of the style (fig. 1). The inside had generally a deep splay, and simple molding on the outside. Small circular windows sometimes occur in Norman work.

In the Early English style, the windows were more



elongated, and had pointed arches. They are frequently grouped in twos or threes, and placed so close that the wall between becomes a mullion. The wall over the group contained within the inclosing arch then becomes perforated with a quatrefoil or other ornamental opening, and thus the simpler forms of tracery become introduced. The interior arches are splayed off, and are frequently elaborately decorated with shafts and arch moldings. The lancet window (named from its shape) is common in this style. Circular windows also are used with tracery formed by little radiating shafts with small arches. The triangular window, on a small scale, is occasionally seen.

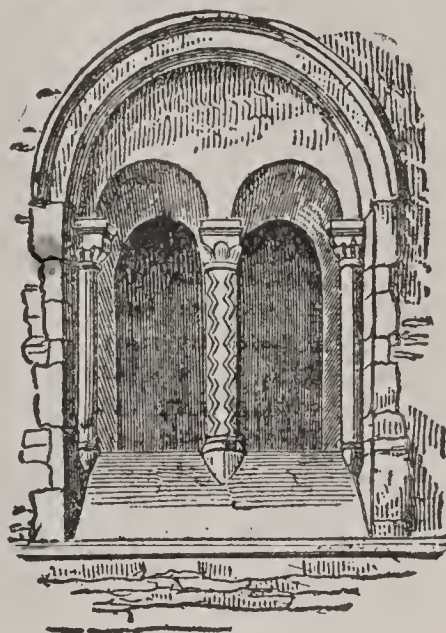


Fig. 1.—Bucknell, Oxford.

In the Decorated style the windows become enlarged and filled with mullions and tracery. This is at first simple, and composed of geometric figures such as the origin and progress of Tracery (q.v.) naturally led to. As the style advanced, more flowing forms were introduced, until, in the 15th c., the tracery passed into the Perpendicular Style (q.v.) in England, and into the Flamboyant (q.v.) in France. The heads of the lights, and the apertures in the tracery, are usually foiled, and the inner jambs are splayed and ornamented with moldings, shafts, etc. (fig. 2). In elaborately traceried windows the jamb and arch moldings are occasionally very small, but they are usually bold and deep.

In the later Tudor style the window-heads became flattened into the four-centre arch; and in the time of Elizabeth and James I. the arch gave place altogether to the flat lintel with the opening divided by mullions into rectangular lights, sometimes foiled at top. Circular windows, with elaborate tracery, are found chiefly in the Decorated period.

In domestic buildings the windows are similar to the above, but square-headed windows occur more frequently, to suit the height of the floors; and the space between the



## WINDSOR.

sill and the floor is recessed and fitted with seats. Transoms also are common. The bow or bay window (see BAY-WINDOW) is a frequent and elegant feature in later Gothic buildings.

In the revived Classic styles the windows are almost invariably plain rectangular openings, with either a flat

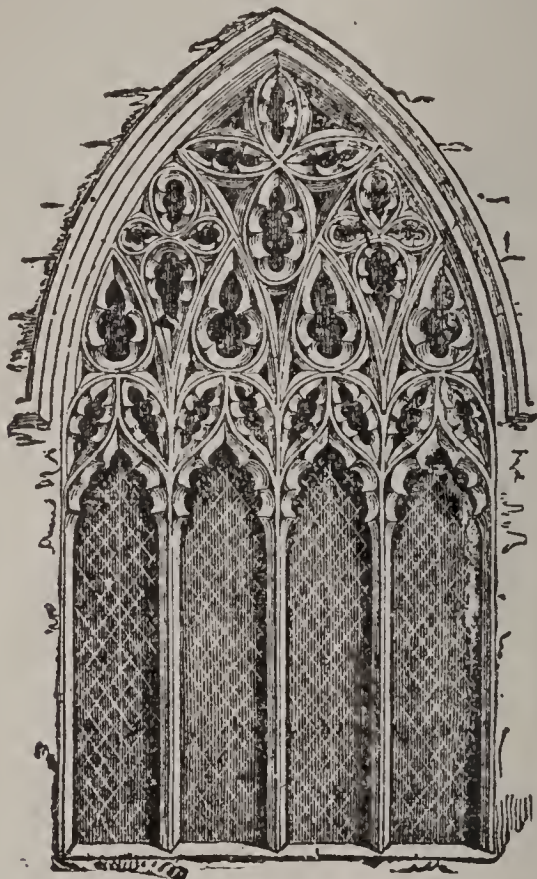


Fig. 2.—Little St. Mary, Cambridge, circa 1350.

lintel or semicircular arch-head. They have sometimes architraves round the jambs and lintel, or are ornamented with pillars supporting an entablature or pediment above. The architraves are frequently carved, and the cornices carried on trusses at each side.

A tax on windows, levied in England 1695, was abolished 1851.

WINDSOR, *wîn'zér*, properly NEW WINDSOR: municipal and parliamentary borough of Berkshire, England; on the right bank of the Thames; 23 m. w.s.w. of London. W. and Eton, on the opposite bank of the river, form one town, though they belong to different counties. The town is interesting chiefly as the scene of *The Merry Wives of Windsor*, and for the antiquity of its castle and parks, which have been a favorite residence of English monarchs since the time of William the Conqueror. The elevated plateau of natural chalk on which it stands marked it out, no doubt, as a naturally strong place; but the deficiency of water which such a position entailed was a serious objection to its being adopted as a permanent residence. The older palace of the English kings was at *Old Windsor*, about 2 m. distant, and considerable doubt seems to exist among antiquaries and historians as to the first Eng.

## WINDSOR.

lish king who built solid work of masonry at Windsor Castle. In the time of Edward the Confessor it was probably a wooden structure, as stone was difficult to be had, and wood was abundant. William the Conqueror probably built the first substantial stone buildings, and regularly fortified the place; but the absence of water, except what was carried to it from the Thames, must have long been a serious drawback to its importance as a military station. The history of the existing castle begins in the reign of Henry III. The buildings may be said to be grouped in three portions—the Middle Ward, containing the Round Tower; the Lower Ward, on the w., containing St. George's Chapel, the houses of the Military Knights, cloisters, etc.; and the Upper Ward, on the e., containing the sovereign's private apartments. The chapel, which was begun by Henry III. and completed by Edward III., was rebuilt by Henry VII. and added to by Cardinal Wolsey. Under this chapel is the burial vault of the present royal family. The Round Tower, formerly believed to be Norman, but in which there is not a single yard of Norman masonry, was built in the 18th year of Edward III. to receive the Round Table of the knights of the newly founded order of the Garter. The park and forest immediately adjoining cover 13,000 acres, and contain many historic trees, such as Elizabeth's Oak; Shakespeare's Oak; the Long Walk, made in the reign of Charles II.; and Queen Anne's Ride of Elms, 3 m. long. Herne's Oak, rendered famous by Shakespeare, was blown down 1863, Sep., and a stone and young tree now mark the spot. The oldest planted timber in England—viz., that of the reign of Elizabeth—is in Windsor Park, and there are many oaks whose age must be 1,000 years. In 1790 the royal forest at Windsor contained about 60,000 acres.—Pop. (1881) 19,082.—See Tighe's *Annals of Windsor*; Menzies's *History of Windsor Forest*; Hepworth Dixon's *Royal Windsor*. Pop. about 15,000.

WINDSOR: town, in Hartford co., N. Conn., on the Framington and the Connecticut rivers, and on the New York, New Haven and Hartford railroad. W. was first settled about 1635 and is the oldest town in the state. It has telegraph, telephone, and express services, is in an agricultural section, and has some manufactures. The leading products are fruit, tobacco, dairy produce, canned goods, paper, woolen goods, and electrical machinery and appliances. Pop. (1890) 2,954; (1900) 2,838.

WINDSOR: town, Essex co., s.w. Ontario, Canada. It is opposite Detroit, Mich., and is a port of entry on the Detroit river and an important point for shipping grain. W. is on the Michigan Central, Canadian Pacific, and Grand Trunk railroads in the centre of a produce and fruit raising region. Its manufactures are leather, carriages, and tobacco; there are stone-quarries and wine-presses in the vicinity. Five newspapers are issued.—Pop. (1891) 10,322; (1901) 12,153.



## WINDSOR-CHAIR—WINDWARD ISLANDS.

**WINDSOR-CHAIR**, n. *wîn'zér*: strong, plain chair, made entirely of wood, seat and back; a sort of low wheel-carriage.

**WINDSOR LOCKS**: post-village and tp. in Hartford co., Conn.; on the Connecticut river, and on the New York New Haven and Hartford railroad; 12 m. n.-by-e. of Hartford. The village has excellent water-power, provided by a canal, navigable for boats of 85 tons, which has been dug around the rapids of the river. There are manufactories of hosiery, paper, steel, silk, rubber rolls, school furniture, machinery, cotton warp, stockinet goods, and iron-found. products. Pop. (1880) 2,332; (1900) 2,997.

**WINDTHORST**, *vint'horst*, **LUDWIG**: parliamentary leader: 1812, Jan. 17—1891, Mar. 14; b. Kaldenhof, Hanover. He made his preparatory studies in the Carolinum at Osnabrück; studied law at Göttingen and Heidelberg universities, and entered the legal profession. He became Oberappellationsrath in Celle 1848, and a member of the second Hanoverian chamber 1849, there from the first defending the same principles regarding the relations of church and state to which he steadily adhered till death. He became leader of the ministerial party, pres. of the second chamber, and minister of justice 1851. He resigned his place in the cabinet 1853, and became again a simple member of the second chamber. Again he was chosen to a place in the govt. as minister of justice 1862. After Hanover was annexed to Prussia, W. conducted the negotiations with Bismarck in regard to the compensation to be made to the deposed King George for the loss of his crown. In the field of Prussian and German politics Dr. W. found larger opportunity for his remarkable talents. In 1867-71 he was a member of the N. German diet and of the Prussian house of deputies; 1871 he was a member of the first diet of the new German empire, and subsequently of the Prussian house of deputies: in both these bodies he was from the beginning the recognized leader of the party of the centre, or Rom. Cath. clerical party. His mastery of parliamentary law, his acuteness of intellect, piercing wit, and readiness in debate, aided always by the perfect discipline of his party, made him a dangerous and harassing opponent of the govt.; his parliamentary strategy and tactics were equal to every emergency, and he never hesitated to make alliances with any of the heterogeneous fractional or factional parties, whether of the left or of the right. For 16 years Dr. W. led the struggle against the Kulturkampf and the 'May laws,' and saw those laws cancelled in every essential feature two years before he died.

**WIND'WARD ISLANDS**: see **ANTILLES**.



## WINE.

**WINE**, n. *wīn* [L. *vīnum*; Gr. *oinos*; Goth. *vein*; Icel. *vīn*, wine]: the fermented juice of grapes; the state induced by excessive use of the fermented juice of the grape; intoxication; the juice of other fruits prepared in imitation of wine; in *pharmacy*, a solution of a medicinal substance in wine, as *wine* of ergot. **WINY**, a. *wī'nī*, resembling wine in flavor or quality. **WINE'LESS**, a. *-lē's*, without wine. **WINE'BAG**, *familiarly*, one accustomed to drink large quantities of wine. **WINE'-BIBBER**, a hard drinker of wine. **WINE'-BIBBING**, the act or practice of drinking much wine. **WINE'-COLORED**, a. approaching the color of red wine. **WINE'-BISCUIT**, a sweet fancy biscuit served with wine. **WINE'-CELLAR**, a vault or cool place for keeping wine in. **WINE'-COOLER**, a vessel for cooling wine before it is used; a stand containing ice into which wine in bottles is placed to be cooled; another form consists of a porous vessel of earthenware, which when wetted evaporates rapidly, absorbs heat from the wine, and so cools it. **WINE'-DECANTER**, a clear glass bottle for holding wine at table. **WINE'-FAT**, or **-VAT**, the vessel into which the grape-juice flows from a wine-press. **WINE'GLASS**, a glass from which wine is drunk. **WINE'GLASSFUL**, as much as a wine-glass will hold; in medical prescriptions, about two fluid ounces. **WINE'-MEASURE**, the standard of capacity by which wine is measured—the old English gallon of 231 cubic inches being the unit in the United States, though superseded in the United Kingdom since 1825 by the imperial gallon of 10 imperial lbs. or 277·274 cubic inches. **WINE'-MERCHANT**, one who sells wine. **WINE'-PRESS**, a machine or place where the juice is pressed out of grapes.

**WINE, CHEMISTRY AND MANUFACTURE OF**: the chemical nature of the juice of the grape, and the methods by which it is prepared for use. As the same variety will, under different external influences, produce very different grapes, our consideration here must be confined to the most typical form of grapes. A certain variety of grape, when grown on the Rhine, furnishes a species of Hock; the same grape, in the valley of the Tagus, yields Bucellas; while in the island of Madeira it produces the wine known as Sercial, which has a flavor quite different from either of the others.

The principal component of the juice of ripe grapes is water, in which are various substances, either held in solution or very minutely divided. The juice as obtained by pressure is thick, and exposure to the heat of the sun rapidly changes it into a fermented liquid. As principal components held in solution in the water, Prof. Mulder mentions sugar (both grape-sugar and fruit-sugar); gelatine or pectine; gum, fat, wax, vegetable albumen, vegetable gluten, and other substances of the nature of extractive matters, which are not accurately determined; tartaric acid, both free and combined with potash (as cream of tartar), partly also combined with lime: in some cases we find also racemic acid, malic acid, partly quite free, partly combined with lime, and, according to some, tartrate of potash and alumina; further, oxide of manganese and oxide

## WINE.

of iron, sulphate of potash, common salt, phosphate of lime, magnesia, and silicic acid may also exist. Although no other ingredients have as yet been discovered in grape-juice, others, which appear only during fermentation, and impart not only the vinous smell common to all wines, but the aroma (bouquet) and the flavor peculiar to each wine, must exist in it in small quantities. In those cases where the skins are allowed, as in the preparation of red wine, to ferment with the juice, the constituents imparting odor and flavor may be drawn from them. Coloring matter and tannic acid are undoubtedly found in the skin, and are thus imparted to red wines. Moreover, the grape-stones, which are left with the skins, yield tannic acid freely during fermentation. The different proportions in which the inorganic matters—the potash, soda, lime, magnesia, iron, manganese, sulphuric acid, phosphoric acid, and chlorine—exist in grape-juice exert very great influence on the quality of the wine, as to color and taste. With regard to the acids of grape-juice, or *must*, as it is technically called, Prof. Mulder observes that, as a general rule, the three acids—tartaric, malic, and citric—are rarely found together in one fruit, and he doubts whether the presence of citric acid has been fully proved. Malic acid exists in unripe, and tartaric acid in ripe grapes; and while no malic acid exists in wine made from perfectly ripe grapes, a small quantity is present in most wines. *Racemic acid*, nearly allied to Tartaric Acid (q.v.), exists in exceptional cases in grapes. The quality of wine is affected only when this acid is largely present, because less lime than usual will be found in it, racemate of lime being less soluble than tartrate of lime, and, further, because cream of tartar is more soluble than biracemate of potash. Such wines are consequently sweeter, and—if red wines—darker colored, than wines containing only tartaric acid. The quantity of sugar varies extremely. In the juice of very ripe grapes it may reach 40 per cent. According to Fontenelle, the juice produced in s. France contains 30 to 18 per cent.; while in the neighborhood of Stuttgart, Reuss determines it at 25 to 13 per cent. In the low and variable temperature of Holland the juice of the best grapes yields only 10 or 12 per cent. of sugar. The composition of the albuminous matter is not clearly determined. In an analysis of the must of the Riessling grapes of Grumbach, Beltz found that the gluten (no albumen was found) was 30 times less abundant than the sugar: it probably varies 1 to  $\frac{1}{2}$  per cent. The only other ingredient requiring notice is fat, chiefly but not entirely derived from the grape-stones, in which it is an abundant ingredient: it occurs in wine, in minute quantity, in the form of a fatty acid.

Concerning the fermentation of the grape-juice, it has been already stated that the saccharine contents of grape-juice range from 13 to 30 per cent. If we regard all this sugar as grape-sugar,  $C_6H_{12}O_6$ , with an equivalent of 180, then each atom may be resolved into 2 atoms of alcohol ( $C_2H_6O$ ), with an equivalent of 46, and 2 of carbonic acid



## WINE.

gas ( $\text{CO}_2$ ), with an equivalent of 44, according to the equation—

Grape-sugar.      Alcohol.      Carbonic Acid.



provided that there is no loss; or under the most favorable conditions of fermentation, 180 parts (by weight) of anhydrous grape-sugar, or 198 of the hydrated sugar (with the formula  $\text{C}_6\text{H}_{14}\text{O}_7$ ), may yield 92 parts of alcohol. According to this, the juice of French and German grapes gives, when analyzed, as a maximum, 7 to 15 per cent. of alcohol by weight. But some of the sugar remains undissolved, and, during fermentation, more alcohol is evaporated than water; therefore, for such grape-juice, or rather for the wine to be produced from it, the alcoholic contents must be under 15 per cent. as maximum, and 7 per cent. as minimum. According to Mulder, sugar is found in all wine, and its quantity depends to a considerable extent upon the treatment to which the grapes are subjected before pressure. Tokay wine, e.g., is prepared from grapes which have been allowed not only to become overripe, but partly to dry on the vines; *vin de paille* is obtained from grapes dried on straw exposed to the sun; and in both these cases, water is evaporated, and the concentrated juice yields a wine of extra strength. The strong heavy wines used by the ancients were thus prepared. But, on the other hand, Dr. Bence Jones, in the Appendix to his translation of Mulder's work, declares that while Port, Sherry (except in two instances), Madeira, and Champagne always contain sugar, Claret, Burgundy, Rhine, and Moselle wine (except one sample of Sauterne) are always free from every kind of sugar. When the grapes are dried on the vine, the wine is called *vin sec*; and when the juice has been evaporated by the aid of heat, the wine is called *vin cotti*.

Because of the close connection between the amount of sugar in the grape-juice and the excellence of the wine which it yields, attempts are often made, especially in bad seasons (lack of heat and light, and excess of rain), to introduce extraneous sugar into the juice; or, as it is technically called, to *doctor* it. For this purpose, a cheap fermentable sugar is added to the sour juice, an adulteration which cannot subsequently be detected by chemistry, though it may be suspected, from absence of the proper aroma from the wine. Similarly, sugar is often added to good grape-juice, to obtain a stronger wine than the natural product: many imitations of Port wine are thus manufactured. The character of the wine is much influenced by the extent to which the process of fermentation is allowed to proceed: if it goes on till all the sugar is converted into alcohol, a *dry* wine is produced; when it is checked before the change is completed, a rich *fruity* wine is produced; and when the wine is bottled while the fermentation is in progress, effervescent wine is formed.

Shortly after the must has passed from the wine-press, symptoms of fermentation appear; the juice becomes more



## WINE.

turbid, bubbles rise to the surface, and a froth soon settles there. This process in a moderate climate usually reaches its highest point in three or four days; and before it is quite finished, the whole liquid mass is stirred up to re-excite the process. For this purpose, in many districts, a naked man formerly (we do not know if this is still general) went into the wine-tub, who both accomplished the necessary stirring, and promoted fermentation by his animal heat. Several persons have been killed in this way by suffocation from the atmosphere of carbonic acid gas. In two or three weeks, the fluid becomes comparatively clear, and a precipitate forms at the bottom. The wine is now removed from the sediment into another vessel, and a slow form of fermentation—*after-fermentation*, as it is termed—goes on for several months, sugar being constantly converted into alcohol and carbonic acid, and a fresh precipitate forming at the bottom. Several similar changes into other vessels are made, for riddance of the sediment, till the fluid is fit for transfer into casks. That the process of fermentation may go on satisfactorily, not only must water, sugar, and a nitrogenous matter in a state of actual change be present, but there must be a certain temperature and a certain amount of atmospheric air present. ‘Although,’ says Mulder, ‘there is a wide interval between the extremes of temperature at which fermentation is possible, the boundary is very narrow which limits good and active fermentation in every kind of wine. The grapes of each country ripened under different degrees of summer warmth, and very unequally rich in constituents, require very different temperatures during fermentation; and different temperatures are required also for grapes which are the product of a warmer or a colder summer. But on these points we have little accurate knowledge. All we know is, that a high temperature during autumn promotes fermentation, and a low one is detrimental to it; and that inequality of temperature during fermentation is extremely injurious, and not unfrequently spoils the wine altogether.’ ‘To what extent it is expedient to admit atmospheric air to the must, so that the fermentation may go on most favorably, is a point regarding which there has been much discussion, and which is not definitely settled. While some have asserted that no air is necessary to development of fermentation, others have maintained that the wine is improved by free admission of air during fermentation. Gay-Lussac proved experimentally that air is essential to initiate fermentation, which would then be continued without any fresh supply; and for many years wine was made in France with almost total exclusion of air from the fluid by an arrangement intended to prevent the escape of alcohol by evaporation; but when the same chemist proved that by the use of open vats scarcely  $\frac{1}{200}$  part of the alcohol was lost, this arrangement fell into disuse. Judging from the method of preparing Bavarian beer, in which air is allowed to enter freely, Liebig recommended the same in the case of wine, and suggested that a large opening be made in the casks in which fer-

## WINE.

mentation takes place. This method has been tried on a large scale by Von Babo, Crasso, and others, with red wine, which was found to be of a better quality than that which underwent the same process in a cask which was closed and only provided with a glass tube for escape of the carbonic acid. But in other experiments with white wine, the wine in open casks appeared to lose in aroma; hence the solution of this question apparently depends on the kind of wine. Liebig's opinion has been very fiercely, and, as Mulder thinks, unfairly attacked: the probability is, that wines containing much sugar may be allowed with advantage to ferment in closed vessels, while those less rich in that substance may be left in open casks, provided the temperature be low and equable. When the main object is to increase the quantity of alcohol, the admission of much air is injurious, since it promotes formation of acetic acid, and causes corresponding loss of alcohol.

The actual substance—*ferment*—which causes the breaking-up of sugar into alcohol and carbonic acid, has been submitted to careful chemical and microscopical examination. One hundred parts of sugar require about 1·5 parts of ferment reckoned in the dry state; and as the analysis of ferment shows that about half of it consists of albuminous matter, it follows that  $\frac{3}{4}$  of a part of albuminous matter are required for conversion of 100 parts of sugar into alcohol and carbonic acid. Ferment consists of cells or globules of *Torula* (q.v.), which are precisely the same in production of wine and of beer. It is the contents of these cells which contain the active albuminous matter; while the cell-wall, consisting of cellulose,  $C_6H_{10}O_5$ , and produced from gum or vegetable mucus, is inert.

The leading points in which the constituents of grape-juice and those of wine differ from one another in consequence of fermentation, are, that in the wine there is a diminution (1) of the mucilaginous and saccharine matters, in consequence of the formation of ferment and alcohol; (2) of those substances insoluble in common water, but held in solution in the viscid must, e.g., phosphate and sulphate of lime; (3) of cream of tartar, tartrate of magnesia, and sulphate of potash, which, being less soluble in spirit than in water, fall as the formation of alcohol increases. Red wines lose a portion of coloring matter and of the tannin, which is withdrawn by these salts, and hence become of lighter color and less astringent. Before noticing the alcoholic strength of different wines, we note briefly the concluding steps necessary for rendering wine fit for use. The process of *clearing* is undertaken for removing all the sediment in which albuminous matters may still occur, and for diminishing the coloring matter and tannin of red wines. Among the substances used for these purposes are albumen, isinglass, gum, milk, lime, gypsum, etc.: in warm countries, gum is preferable to albumen or isinglass. The addition of lime throws down a precipitate of salts of lime, which carries down, in the case of red wine, considerable coloring matter; its addition gives a sweeter and less astringent taste to the wine, and



an appearance of age. As a general rule, clearing increases the durability of wine. *Sulphurizing* is a process applied especially to sweet white wines, which possess an excess of sugar and albuminous matter, and little tannic acid, and thus become easily decomposed. Its object is to check undue fermentation, and to prevent formation of mold, which afterward imparts a musty taste to the wine. The process is effected by burning sulphur in bottles or casks, and instantly pouring in the wine, which absorbs the sulphurous acid. Wine intended for exportation to warm climates is usually strongly sulphurized. Of course, great care must be taken that the sulphur is free from its common impurity, arsenic. Instead of sulphurizing, another method of hindering the fermentation of sweet wine is adopted in some parts of France: it consists in putting  $\frac{1}{1000}$  part of powdered mustard into the wine; but how it acts is unknown.

Having traced the chemical history of wine from its original state of grape-juice to the time when, having been clarified, and poured into casks and bottles, it is fit for use, we notice the subsequent changes which it undergoes in the cellar. The ages at which different wines attain perfection are, as is well known, extremely different. As a general rule, according to Mulder, wines which have retained a considerable portion of albuminous matter, and possess but little tannic acid, cannot resist the influence of time; they become acid, or undergo some other change. This occurs in the case of Rhine wines, which contain but little alcohol; and all those wines which contain much sugar, or but little tannic acid, cannot be kept long. Wines which can be *cellared* are those which improve; or, to speak more correctly, those wines are stored which improve with age. In these, odoriferous substances are formed; and the wine becomes less acid and of better taste. Such wine as is colored often deposits considerable sediment; and if it be stored in casks, there is a constant increase of alcohol. Wine is improved by being kept in wooden casks; as water escapes by evaporation, and the other constituents are relatively increased. The vinous constituents being thus concentrated, exert stronger chemical action on each other, and render the wine not only stronger, but better flavored. The change, however, does not stop here. The loss of water must be replaced by addition of wine, otherwise the action of the air would turn the wine sour, and convert the alcohol into acetic acid; and the diminution of water thus replaced by wine causes constant increase of tartaric acid. Wines poor in sugar may thus soon become too sour; consequently, all wines cannot undergo this process. The popular idea, that wine which has grown old in bottles has therefore become richer in alcohol, is altogether false, and is doubtless founded on the fact that it is only the strongest wines that can be preserved. The color, however, of bottled wine is materially affected by age; liqueur-wines and red wines containing no large amount of tannic acid, becoming darker, while wines rich in tannic acid, e.g., Port, de-



posit a sediment, and become lighter. Old bottled wines contain odoriferous constituents—ethers of various organic acids—which are not found in new wine. For explanation of the mode of formation of these compounds, to which wine owes its *aroma*, consult the chapter on ‘The Odoriferous Constituents of Wine,’ in Mulder’s work; we here merely remark, that diminution of the free acids is necessarily associated with the formation of these compounds; and that this diminution can occur only by the acids being either decomposed or combined with non-acid substances, both of which operations are here the result of a very slow chemical process. This effect of time may, however, be imitated by art; and if bottles corked, but not quite filled with wine, are placed for two hours in warm water at a temperature of 185° F., and after cooling are filled, their contents possess the flavor and aroma of wine that has been bottled several years. This result was originally obtained by Appert; but Pasteur and others have, during the last few years, again brought the subject before the French Acad. Wines which have been long in bottle sometimes acquire a peculiar flavor, incorrectly referred to the cork. It is due to the peculiar mold which grows from the outside of the cork inward; and should it reach the inner surface, it imparts to the contents of the bottle a peculiar taste; and this wine is said to be *corked*. Very similar to this is what is known as ‘the taste of the cask,’ a peculiar flavor sometimes acquired by wine before bottling. This flavor is regarded as dependent on the development of a peculiar essential oil, during the growth of ‘mold,’ on the surface of the wine. It can be removed by the addition to each pipe of about a quart of olive-oil, which dissolves the unpleasant flavoring matter, and carries it to the surface.

In submitting matured wines to chemical analysis it is found that they differ materially from one another in their composition; especially as the wine is, or is not, red. In white wine no special coloring matters are found, and only a trace of tannic acid; while in red wine both are present. In wine generally, the principal ingredients are alcohol and water; then sugar, gum, extractive and albuminous matters; then free organic acids, such as tartaric, racemic, malic, and acetic acid; and salts, such as the tartrates of potash, of lime, and of magnesia, sulphate of potash, chloride of sodium, and traces of phosphate of lime; also, especially in old wines, substances imparting aroma, as *œnanthic* and acetic ethers, and other volatile odoriferous matters (among which Mulder mentions butyric and caprylic ethers, each having a pineapple odor, caproic, pelargonic, capric, and propionic ethers, amylic alcohol and many of its ethers and other compounds, aldehyde, acetal, and probably racemic, citric, and malic ethers). In red wines, and in many others, a little iron, and possibly some alumina, may be found; lastly, the best wines contain, according to Fauré, a peculiar matter, which he terms *œnanthin*, and to which he ascribes the substance or body of the wine; but which seems to other chemists

## WINE.

scarcely to differ from gum or dextrine. These ingredients, as Mulder observes, vary exceedingly in proportion. The quantity of some is so small that the substance almost disappears during analysis; others can just be determined by a delicate balance; while others, again, are freely present. Putting aside taste and smell as standards of comparison, most of the essential dietetic and therapeutic properties of wine depend on the *alcohol*, *sugar*, and *free acids*, especially *tartaric acid*, contained in it. Mulder, in his chapter on 'The Amount of Alcohol in Wine,' gives many analyses of different wines in which the percentage of alcohol is determined. We give only the abstract of the analyses made by his translator, Dr. Bence Jones, who found that the alcohol varies in

	from	Per Cent.	to	Per Cent.
Port, . . . .	"	20·7	"	23·2
Madeira, . . . .	"	19·0	"	19·7
Sherry, . . . .	"	15·4	"	24·7
Champagne, . . . .	"	14·1	"	14·8
Burgundy, . . . .	"	10·1	"	13·2
Rhine Wine, . . . .	"	9·5	"	13·0
Claret, . . . .	"	9·1	"	11·1
Moselle, . . . .	"	8·7	"	9·4

while in

Brandy, . . . .	there was	50·4	"	53·8
Rum, . . . .	"	72·0	"	77·1
Geneva, . . . .	"	49·4	"	
Bitter Ale, . . . .	"	6·6	"	12·3
Porter, . . . .	"	6·5	"	7·9
Cider, . . . .	"	5·4	"	7·5

Sugar is found in all wines (it has been noticed previously that Dr. Bence Jones denies this); though in certain kinds very little sugar exists. According to Fresenius, the sugar in four kinds of Rhine wine amounts to exactly six-sevenths of the extract remaining after evaporation, the seventh part consisting of the salts and non-volatile unfermentable matter. In red Bordeaux, on the other hand, very little sugar is found; red Sauterne contains less than 1 per cent. of extract, and Hermitage 1·7; hence the quantity of sugar must be very minute; while some kinds of Muscat yield 24·5 of an extract, containing about 22 per cent. of sugar. Small as is the quantity of sugar in some wines, it is of great importance in diminishing the sharp taste of the free acids, and in imparting agreeable flavor. Good red wines should contain at least one-half per cent. of sugar, and the quantity is sometimes larger. Some of the sweet wines contain nearly one-fourth of their weight of saccharine matter.

The following results were yielded by the experiments of Dr. Bence Jones:

Sherry (18 samples),	sugar in 1 oz. varied from	4 to 18 grains.
Madeira (9 samples),	"	6 to 20 "
Champagne (4 samples),	"	6 to 28 "
Port (8 samples),	"	16 to 34 "
Malmsey Madeira, . . . .	"	56 to 66 "
Tokay, . . . .	"	74 "
Cyprus, . . . .	"	102 "

Under the term 'free acids' are included the acid tartrate of potash, known as cream of tartar, and other soluble bitartrates found in wine, besides such acids as are

quite uncombined, such as tartaric, malic, and acetic acid, and a trace of free tannic acid. Sugar has so much power in concealing the free acids, that their amount cannot be estimated with certainty by the flavor of the wine, and must be estimated chemically by ascertaining how much of an alkaline solution of given strength must be used to render a given quantity of wine perfectly neutral to test-paper. Volatile acids, e.g., acetic acid, may either be determined separately, or included with the others; and, except this acid, all the other acids in wine may practically be calculated as tartaric acid. Mulder found that acetic acid was present in 20 different kinds of wine which he examined, the amount of the anhydrous acid ranging from 1·75 thousandth parts in Madeira to 0·25 thousandth parts in Tavella. In the same 20 kinds of wines, the free tartaric acid ranged from 2 to 7 parts in 1,000 of wine, Tavella having the largest, and Bordeaux Sauterne the smallest quantity. Of the tannic acid, traces may be found in all white wines, but in no white wine is it sufficiently abundant to be of the least medical or dietetic importance. On the other hand, it is abundant in Port and heavily loaded Bordeaux wines, especially when new. In the course of time, this tannic acid becomes oxidized into a sparingly soluble compound, called by Berzelius the *apothema*, or precipitate of tannic acid—a process facilitated by exposure of the wine in bottles to full daylight. There is no doubt that this acid, by combining with the albuminous matters, tends to increase the durability of these wines. Dr. Bence Jones, in his Appendix to Mulder's treatise, gives numerous results of experiments regarding the acidity of wines by Prout, Liebig, Fresenius, and himself. His general conclusions are, that, proceeding from the least acid wine to the most acid, we have Sherry, Port, Champagne, Claret, Madeira, Burgundy, Rhine wine, Moselle. The least acid fluids examined were Geneva and whisky; then rum, brandy, ale, porter, stout: all the wines were more acid than the malt liquids. See also Dr. Druitt's work on *Cheap Wines*.

The recent decline in French vintages by reason of the phylloxera has developed a new wine-making industry in France. Enormous quantities of dried raisins are imported mainly from Smyrna and the East, are soaked in water 40 or 50 hours, and then treated as fresh grapes. Every 100 kilograms of raisins so treated yield 325 litres of white or straw-colored wine, now recognized by the authorities as harmless; 30 million kilograms of raisins and currants were used in 1880 in this way.

*Diseases of Wine.*—The most important of the diseases of wine are the following: 1. *The Turning of Wine.*—This is incidental to young wine, and seems to occur under special conditions of the weather. The color becomes darker, and the taste first disappears, and if the disease goes on, becomes disagreeable: the wine becomes turbid and acid. This disease is caused by a decomposition of tartar.

2. *The Ropiness of Wine.*—This consists in formation of



vegetable mucus from the sugar of the wine, and is known as mucus fermentation. The wines liable to this change are those deficient in tannic acid.

3. *The Bitterness of Wine*—to which Burgundy wines especially are exposed—seems due to a second fermentation, inasmuch as a large amount of carbonic acid is evolved. It has been ascribed, whether correctly or not, we cannot say, to the formation of citric ether, which is very bitter. The disease is caused by the sediment, and often ceases when the wine is drawn off into other casks.

4. *The Acidifying of the Wine*—depending on conversion of the alcohol into acetic acid—may be stopped at its commencement by adding alkaline carbonates, which, however, destroy the color and affect the taste of the wine.

5. *The Moldiness of Wine*—a disease in which mold-plants are produced on the surface. How or under what conditions the mold is formed, is not known, except that the admission of air is favorable to the disease.

For further information on this subject, consult Henderson's *History of Ancient and Modern Wines*, Bence Jones's translation of Mulder's *Chemistry of Wine*, and recent works of Shaw and Denman, in English; those of Julien, Chaptal, Fauré (1844), and Batilliat, in French; and those of Ritter, Balling, Von Babo, Bronner, etc., in German; also the chief works on technological chemistry in all languages.

*Manufacture.*—The mode of manufacturing wine varies in details in different countries. Pagnierre, in his treatise *On the Wines of Bordeaux*, gives the following description of the manufacture of the superior Clarets. The grapes, after being gathered, are picked; all that are likely to injure the quality of the wine being carefully removed. A principal vat of the best fruit, which is called the mother-cask (*cuve-mère*), is then made, into which, after picking, the workmen continue to put the best grapes, without their stalks, and without treading them, till they are from 15 to 20 inches deep; after which they throw about two gallons of old Cognac or Armagnac upon them, and then another bed of picked grapes, followed by two gallons more of brandy, and so on till the vat is full. Spirit of wine is then added, about four gallons being used for a wine-vat of from 30 to 36 tuns. The amount of brandy and spirits that is added varies with the quality of the vintage, the better vintages requiring the less spirit. When there is deficiency of saccharine matter in the grapes, starch-sugar is sometimes added. The *cuve-mère*, when filled, is closed and well covered with blankets to prevent entrance of air, and is left in this state about a month. A small cock or tap is placed in the side of the vat at about a third of its depth from the bottom, to allow observation of the progress of fermentation and to enable the manufacturer to know when the wine, having become cool and sufficiently clear, may be racked off and put into casks, previously prepared by scalding and rinsing with a little spirit. While the *cuve-mère* is at work, the ordinary vintage goes on as follows: The grapes are trodden or acted

on by machinery in the press, and put with their stalks into the vats, when the fermentation takes place naturally. About a foot of the upper part of the vat is not filled, in order to leave space for the fermentation, which in very mature vintages sometimes occasions an overflow of these limits. The term *chapeau* is applied to the floating mass of stalks, seeds, and skins on the surface. The vats are lightly covered, and in one to two weeks the wine is ready for being drawn off; for if it is left upon the lees (*marre*), or in contact with its crust (*chapeau*), it would take the disagreeable taste of the stalks. The barrels in which it is then placed are filled to about two-thirds or three-fourths, after which the *cuve-mère* is emptied, and its wine is poured in equal portions into these casks so as to fill them; and the remainder is used to replace every week what is lost by evaporation, or may have leaked away. All proprietors have not the means of making a *cuve-mère*; but in its absence, and with the employment of small vessels, wine of inferior character is produced. The casks being full are left unbunged about a week, the bung-hole being in the mean time covered with a brick or piece of wood. They are filled up every two days; also after bunging, at least once a week, till the wine is in a state to allow the cask to rest with the bung-hole at the side, which is not till after a year and a half.

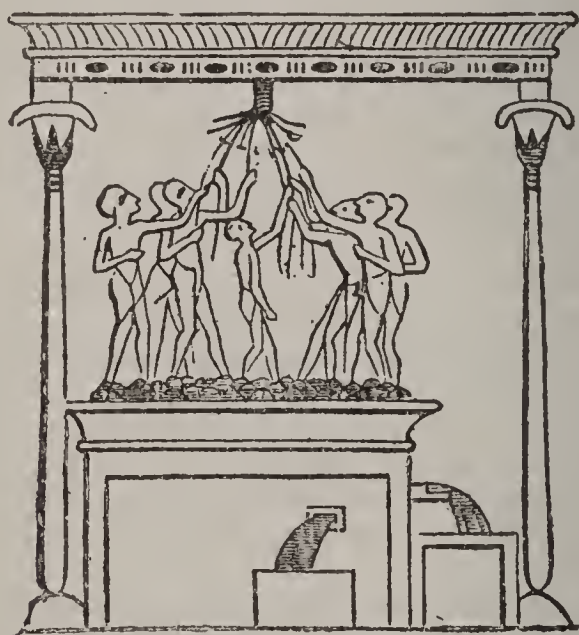
White wines are made in a somewhat different manner. The grapes are not, as in making red wine, put into the vat to ferment, but after removal of the stalks, they are trodden, and when taken from the press, the juice, skins, and seeds are put into casks, in which the fermentation takes place, and wine is formed. When fermentation has ceased, the wine is racked off from the barrels into smaller casks; and any subsequent loss from evaporation must be replaced once or twice a week.

The nature of the wine-press possesses many modifications. The wine-presses of the Jews consisted of two receptacles, or vats, placed at different elevations, in the upper one of which the grapes were trodden, while the lower one received the expressed juice or must (see Joel iii. 13). These vats were usually hewn out of the solid rock (Is. v. 2 [margin], and Matt. xxi. 33). In Wilkinson's *Ancient Egyptians*, I. 46, there is a figure of a wine-press thus composed of two vats or receptacles. The process of treading, which seems to have prevailed from the earliest ages, is shown in our copy of that figure, the treaders being assisted by ropes fixed to the roof of the press. A certain amount of juice was allowed to exude from the ripe fruit by its own pressure before the treading began: this was kept separate from the rest of the juice, and formed the *gleucos*, or 'sweet wine,' noticed in Acts ii. 13. The first drops that reached the lower vat were called the *dema*, or tear, and formed the first-fruits of the vintage, which were to be presented to Jehovah (Ex. xxii. 29). Although the ancient system of treading the grapes still prevails in many countries, it is being gradually displaced by various mechanical appliances. In some parts of France, two wood-



en cylinders turning in opposite directions are employed to crush the fruit; and accounts of more complicated presses are in the various works on wine by Cyrus Redding and later authors.

*Commerce*—The manufacture of wine has been carried on in all countries where the grape could be successfully cultivated, from the very earliest periods of history; and in recent times it has followed the footsteps of man, and become established and important in the American and Australian continents. The vine, like most cultivated plants, is capable of producing very numerous varieties, and these, of course, give rise to different qualities of wine; but far more influence is exerted on the quality of the wine by climate, soil, and the position of the vineyard as to the sun's influence; so that we not only have wines peculiar to particular countries, but of those, again, we have usually very



Ancient Egyptian Wine press.

numerous varieties, produced by special causes within those countries; and in addition to all these, again, we have other differences, produced by degrees of skill in manufacture. The earliest wines of which we have any account were made in Asia, but of these we know very little. Later we find abundant evidence of the high esteem in which wine was held by the Greeks, Romans, and civilized contemporary nations; and the name of one of the choicest Roman wines—viz., the Falernian—has continued in use till the present time. From what we learn from Pliny and other writers regarding the extraneous additions made by the Romans to their grape-juice, and the treatment of the interior of their casks, we may doubt whether even Falernian would be appreciated by the English or American palate: see the article 'Vinum' in Smith's *Dictionary of Antiquities*. The mediæval history of wine is involved in obscurity; but we find such abundant mention of Sack and Canary, that though we are not quite clear as to the exact history of those wines, we are not left in doubt as to the high appreciation



of them by the priesthood and nobility of those times. The Greek islands seem to have furnished a large portion of the wine then consumed in Europe, and the merchantships of Venice in the days of her glory appear to have been largely engaged in carrying Greek and Italian wines. The Malmsey of those times was the product not of Madeira, but of the islands of Tenedos, Lesbos, Chio, and Candia.

Burgundy is the oldest wine-producing country of central Europe, and centuries ago the wine of this province was the choicest to be found on the tables of the rich and noble. Much of the Burgundy of the present day has excellent qualities—being of good body, velvety, and of delicate bouquet. A few scarce kinds, such as the Romanée-Conti, are really splendid wines. Claret or red wine, for the English or American market, is the product chiefly of the Medoc district, which begins below Bordeaux, on the left bank of the Gironde, and extends almost to the Bay of Biscay. White wine, or Sauterne, also is produced in the same neighborhood. The general character of the Bordeaux wines, which are of all qualities, is crispness, elegance, and fine bouquet; and they improve by keeping. Sparkling wine of great renown is produced in the Champagne, the finest qualities of which sell at exorbitant prices; and it has been thought that in no other region can wine of the same high character be obtained. See BORDEAUX: BURGUNDY: CHAMPAGNE.

Germany produces fine white but very few red wines. The white are best known in the market as Hocks and Moselles, and are made both still and sparkling. They have much elegance and a racy flavor, but many wine-merchants think they have scarcely the value claimed for them; nevertheless their high price shows that they are much in demand. At the Vienna Exhibition 1873, the jurors on the wine section had before them a sample of Rhine wine made 1706, another coeval with the war of Amer. independence, and another of the year of the battle of Jena. But all these, and others made in the early part of the 19th c., before the days of 'fortifying,' had lost their characteristic taste and flavor, and were but the phantoms of what they had been. See HOCHHEIM: MOSELLE: RHINE-WINE.

The vineyards of Austria are extensive, and produce a great variety of wines, which mostly are consumed in the country itself, the red Vöslauer being the kind principally exported. Hungary is still more a wine-growing country, producing considerably more than it consumes; and is the home of the renowned Tokay (q.v.), which boasts high antiquity, and commands a price more nearly approaching the fabulous than any other wine in the world. Méneser-Ausbruch, Carlowitz, Ruster, Somlauer, and one or two others, are favorably known. Hungarian wines are finding their way to western markets, but the long land-carriage operates as a serious check.

Perhaps the wines best known in British and American markets are the Sherries of Spain and the Ports of Portugal.

The best kinds of Sherry are those technically called *dry*—i.e., free from sweetness. Manzanillo is said to be the purest, but Montilla, Amontillado, and Vino de Pasto also are famous kinds of Sherry. This wine is shipped chiefly at Cadiz, near its place of manufacture. The Malaga wines, both sweet and dry, are widely known; and from Catalonia come what are known as the Spanish Reds. Port Wine (q.v.) is brought mostly from Oporto; and its consumption in Great Britain has, as a rule, continued to increase for nearly 200 years. The shipments had, however, fallen in 1858 to two million gallons; but from that time they gradually rose to the annual total of seven million gallons 1877, three-fourths of which were to England. In the United States this wine is in much less use. For the ten years ending 1876, the average annual shipments of Sherry from Spain amounted to nearly eight million gallons. Nearly all wines passing under the names of Port and Sherry are fortified, i.e., dosed with brandy; but these form only a small portion of the wines produced in the Peninsula. Madeira, where a generation ago the vineyards were almost totally destroyed by the oidium fungus, has in recent years rapidly increased the yield of its highly prized wine.

Italy, with great natural advantages, is behind several other nations in production of fine and especially of sparkling wines; but the Barolo of Piedmont, the Chianti of Tuscany, the Orvieto of the Roman states, the Lacryma Christi of Naples, and other special growths, have high reputation. The celebrated Marsala, a wine with a Sherry-like flavor, comes from Sicily. Not much Italian wine is exported, but the acreage of vineyards must be very large. The lesser wine-growing countries of Europe are Switzerland, Russia, Turkey, and Greece—the latter continuing, as in ancient times, to put resin in what is required for home consumption. Australia has surprised the best French judges by the excellence of her wines, and the Cape continues to yield her luscious Constantia and other growths of fine quality.—The following table gives the annual yield of the more important wine-producing countries, but the great destruction caused in many districts since 1865 by the *Phylloxera* (q.v.) impairs the value of such a table:

	Gallons.
France, average 1863-73 .....	1,176,000,000
Spain, mean of two estimates for 1873.....	450,000,000
Portugal, 1873.....	111,000,000
Germany.....	76,317,000
Austria, 1870.....	84,700,000
Hungary, 1873.....	221,214,000
Italy, 1873.....	750,000,000

The value of a full vintage in France, including the spirit distilled from the husks and stalks of the grape, amounted a few years since to about \$375,000,000. The annual consumption in Paris per head—over 40 gallons—is 80 times more than it is in the United Kingdom; the total imports into Britain 1880 being less than 18 millions of gallons (value £6,465,944).



As to the high prices realized for old wines of famous vintages, it is recorded that in England as much as £2 per bottle has occasionally been given for Port and Tokay; and on one occasion two bottles of old Burgundy were sold at the price of £80 each.

Wine-growing in the United States is now an extensive industry, and gives promise of rivalling that of Europe, both in extent and in quality of the wines produced. The soil and climate of the Pacific coast especially seem well suited for the growth of the grape-vine, and California now leads all the states in this respect.

The first wine produced in this country was made by the Spanish settlers, in Fla. 1565, from the wild grapes which they found growing there in abundance; and the wild grape seems to have been long used for this purpose. It is recorded that in 1796 the French settlers of Ill. produced 110 hogsheads of wild-grape wine. The first vineyard was planted in Va. 1620 by the London Company, who some years later imported French wine-dressers; but the venture was not a success. In 1683 William Penn attempted wine-growing in Philadelphia, but it failed. The first California wine was produced 1769 by the Franciscan fathers from the grapes, hence called 'mission' grapes, brought by them from Mexico. Other varieties have since been introduced, chiefly by the enterprise of a Hungarian, Col. Haraszthy, who spent two years in visiting the wine-growing countries of Europe, and brought back more than half a million cuttings and grape-roots (more than 400 varieties), which he had selected in France, Spain, Italy, and Hungary. Since that time grape-culture especially for wine-making has rapidly extended, and 1886, of the 119,730 acres given to viticulture, 91,043 acres produced only wine-grapes. The total product of Cal. 1902 was 40,000,000 gals., of which 20,000,000 gals. were exported. Wine-making is carried on in 50 of the 57 counties of the state, and employs about 90,000 persons.

There are three distinct wine-growing regions in Cal.: (1) the Coast Range dist., which includes Sonoma, Lake, Napa, Alameda, Santa Cruz, and Santa Clara counties; and excels in its white and red acid wines, such as Hock, Claret, Sauterne, Burgundy, etc. (2) The Sierra Nevada, Forthill, and Sacramento Valley dist., which includes Placer, El Dorado, Tuolumne, Yuba, Yolo, Sacramento, and Tehama counties; and produces excellent dry wines of 'exquisite bouquet,' many of which bear great resemblance to the wines of Hungary, Greece, and Cape Constantia. (3) The Southern dist., which comprises San Bernardino, Los Angeles, San Diego, and Fresno counties, and excels in its Port, Sherry, Madeira, Angelica, and other sweet wines. It was in this dist. (in San Diego) that the first California wine was made. Next to Cal. in wine-production are N. Y., Ohio, and Mo. The Ohio vineyards are chiefly along the shore of Lake Erie, and on the bank of the Ohio river. In the year 1888-9, N. Y. produced 2,528,250 gals., Ohio 1,934,833 gals., Mo. 1,250,000 gals.; the total production throughout the country being



## WINE.

for that year 24,306,905 gals., of which Cal. was credited with more than 14½ millions. In 1900 New York had 38 wineries; value of product \$942,548; Ohio, 52, \$801,684; California, 187, \$3,937,871. The most extensive establishment in N. Y. state is that of the Pleasant Valley Wine Co., founded 1860 in Steuben county.

*Dietetic and Medical Use of Wine.*—The dietetic and medical value of wine has been a subject of much debate. There has been a great change from the theory of former times which held wine or its equivalent to be a necessity of ordinary life and a universal remedy in disease. An extensive school opposes its use not only in health but in every form of illness. See ALCOHOL·TEMPERANCE: TOTAL ABSTINENCE. On this subject the U. S. Dispensatory says (p. 1454):

‘Wine is consumed in most civilized countries; but in a state of health it is at least useless, if not absolutely pernicious. The degree of mischief which it produces depends upon the character of the wine. Thus the light wines of France are comparatively harmless; while the habitual use of the stronger wines, such as sherry, port, madeira, etc., even though taken in moderation, is always injurious, as having a tendency to induce gout, apoplexy, and other diseases dependent on plethora and over-stimulation. All wines, however, when used habitually in excess, are productive of bad consequences. They weaken the stomach, produce disease of the liver, and give rise to gout, dropsy, apoplexy, tremors, and not unfrequently mania. Nevertheless wine is an important medicine, productive of the best effects in certain diseases. In the convalescence from protracted fever it is frequently the best remedy that can be employed. . . . When given in low febrile affections, if it increase the fulness and lessen the frequency of the pulse, mitigate delirium, and produce a tendency to sleep, its further use may be deemed proper; but if it render the pulse quicker, augment the heat and thirst, produce restlessness, or increase delirium, it should be laid aside as injurious.’

It has been claimed that wine is much less frequently prescribed than formerly by the most skilful physicians.

Wine is used to a certain extent as a pharmaceutical menstruum for holding various substances in solution, forming medicated wines, as *wine of aloes*, *wine of antimony*, etc. Of these preparations the U. S. Dispensatory (p. 1455) says: ‘But most wines, particularly the light varieties, are liable to undergo decomposition, and even the strongest acquire such a liability from the principles which they extract from vegetable substances; so that medicated wines, though they keep much better than infusions or decoctions, are inferior in this respect to the tinctures. The proportion of alcohol, however, is not constant; and the preparations, therefore, made with them were formerly of unequal strength. From these causes, few medicated wines are at present retained.’

## WINEBRENNERIAN—WINES.

**WINEBRENNERIAN**, *wīn-brē-nē'rī-anz*, or **CHURCH OF GOD**: denomination of Baptists, calling itself the Church of God, but known by the first appellation from its founder, John Winebrenner (1797, Mar. 25—1860, Sep. 12; b. Md.; d. Harrisburg, Penn.). Settled as pastor 1820 of a German Ref. church in Harrisburg, and at the same time ministering to three other churches in the vicinity, a religious revival among his people excited opposition to him from both lay and clerical brethren; and this led to a separation about 1825. The good work continued and spread, resulting in the formation of churches on an independent and congregational basis. The first organization under the name Church of God was in 1829; and in 1830 a conference of ministers was held, with Winebrenner as pres. In a sermon he gave his views of primitive polity—namely, that churches should be for believers only, without sectarian or human name; with no creed and discipline but the Bible, subject to no ecclesiastical jurisdiction, and governed under Christ by officers of their own, elected by a majority of the church. The conference became annual under the name Annual Eldership, with a triennial meeting termed General Eldership, which attends to the general government and benevolences of the denomination. The ministers are called elders, and are either resident or itinerating. The faith, held without creed, is distinctly evangelical, special importance being given to the two Christian ordinances of Baptism and the Supper, to faith and immersion as essential to baptism, also to a ceremony of feet-washing as obligatory. The Lord's Supper is administered in the evening. The denomination claims to be more primitive in its order than any existing body, though it regards the Free Baptists as nearly akin. It has a publishing-house at Harrisburg; a weekly paper, *The Christian Advocate*; an acad. at Basheyville, Penn., and a coll. at Findlay, O., opened 1886, and numbering 434 students (1895). The denomination had, 1890, in the United States 479 organizations; 522 ministers; 22,511 members; church property valued at \$643,185; (1895) 560 organizations, 36,000 communicants. The W. are represented in 14 states and in the Indian territory. Their chief strength, however, is in Penn., O., and Ind. Missionary labors are sustained in Kan., Mo., Ark., and other states, and in the Indian territory, by an assessment amounting to \$2,000 per annum, levied on the 16 elderships or conferences.

**WINES**, *wīnz*, **ENOCH COBB**, D.D., LL.D.: prison-reformer: 1806, Feb. 17—1879, Dec. 10; b. Hanover, N. J. He graduated at Middlebury Coll. 1827; was midshipmen's teacher in the navy 1829; teacher at Washington, D. C., Princeton and Burlington, N. J., and in Philadelphia; Congl. pastor in Cornwall, Vt., and in East Hampton, N. Y.; prof. of ancient languages in Washington Coll., Penn., 1853, and pres. of the St. Louis City Univ. 1859. From 1862, when he became sec. of the N. Y. Prison Assoc., until his death in Cambridge, Mass., he was devoted to the object of the society, accomplishing more for it, probably, than any other individual in this century. With Dr.



## WINFIELD—WINGATE.

Theodore W. Dwight he visited the penal institutions of the United States, and reported to the N. Y. legislature 1867. He originated the National Prison Assoc.; was appointed U. S. commissioner to organize the International Penitentiary Congress at London; and attended similar congresses. He published his experience in the navy, a trip to China, hints on popular education, commentaries on Hebrew law, works on Adam and Christ, on penitence, regeneration, temptation, the promises of God; and on *The Prisons and Reformatories of the United States and Canada* (1867). *State of Prisons and Child-saving Institutions* (1880) was a posthumous publication.

WINFIELD, *wîn'fēld*: city, cap. of Cowley co., Kan.; on the Walnut river, and on the Atchison Topeka and Santa Fé, the Missouri Pacific, and the St. Louis and San Francisco railroads; 12 m. n. of Arkansas City, 42 m. s.s.e. of Wichita. It has a costly co. court-house, jail, graded school, 6 churches, 3 national banks (cap. \$225,000) and 1 private bank, several flour-mills; and 1 daily, 3 weekly, and 1 monthly periodicals. It is the centre of a rich agricultural region, with which it has large trade. Pop. (1880) 2,844; (1890) 5,184; (1900) 5,554.

WING, n. *wîng* [Icel. *vængr*; Sw. *winge*, a wing: comp. W. *gwingo*, to kick, to spring: Icel. *vingsa*, to swing]: that limb of a bird by which it flies, and under which it protects its young; *figuratively*, care or protection, particularly in the *plu.*; passage by the wing; means of flying; anything compared to a wing in form or position; a side erection attached to the main edifice; in *bot.*, a membranous border by which many seeds are supported in the air and transported from place to place; the extreme right or left division of an army; the ships on each extremity of a fleet arranged in line of battle; in a *theatre*, one of the sides of the stage; also, a scene to fill up the side of the stage; in *OE.*, motive of flight: V. to furnish with wings; to enable to fly or move with speed; to supply with side parts; to transport by flight; among *sportsmen*, to wound in the wing, as a bird; hence, to wound in a limb, as a human being. WING'-ING, imp. WINGED, pp. *wîngd*: ADJ. having wings; swift; rapid; soaring. WING'LESS, a. -*lês*, having no wings; not able to fly. WING'LET, n. -*lēt*, a little wing. WING'Y, a. -*î*, having wings; soaring. WING'-CASE, or WING'-SHELL, the hard outer case of the wings of many insects, as the beetles. WING'FOOTED, nimble; swift; fleet. WINGED-LION, n. the symbol of the evangelist St. Mark, adopted as the heraldic device of the Venetian republic when St. Mark supplanted St. Theodore as the patron saint of Venice. A celebrated bronze figure of the winged-lion of St. Mark, surmounting a magnificent red granite column formed out of a single block, stands in the Piazzetta of St. Mark at Venice. ON THE WING, flying; speeding to an object; going from one place to another.

WINGATE, *wîn'gāt*, CHARLES FREDERICK: sanitary engineer: b. Harlem (New York), 1847, Mar. 5. He was educated in the public schools of New York, and became



## WINK—WINNEBAGOES.

a journalist; was New York correspondent of the *Springfield Republican* for several years over the signature Carl-fried. He has been editor and in part proprietor successively of the *Paper-trade Journal*, *The American Stationer*, *The Housekeeper*, and *The Sanitary Engineer*. Since 1882 he has engaged in sanitary engineering. He has contributed articles to the *North American Review* and other periodicals.

WINK, v. *wīngk* [O. Dut. *wincken*, *wencken*, to wink: Icel. *vanka*, to wink, to rove: Ger. *winken*, to nod: Sw. *winka*, to make a sign with head, hand, or eye: Dan. *vinke*, to beckon (and see WINCE, from same root)]: to close and open the eyelids with a quick motion; to give a significant hint by a motion of the eyelids; to connive; to pretend not to see, always with *at*: N. the act of closing and opening the eyes with a quick motion; the time spent in the act of winking; a moment; a hint given by a movement of the eye. WINK'ING, imp.: N. the act of closing and opening the eyelids quickly. WINK'INGLY, ad. *-lī*. WINKED, pp. *wīngkt*. WINK'ER, n. *-ēr*, one who winks; one of the blinders of a horse. FORTY WINKS, a siesta; a short nap.

WINK'ELRIED (or WINCK'ELRIED), ARNOLD VON: see SEMPACH.

WINKLE, n. *wīng'kl*: see PERIWINKLE 1.

WINKLEY, *wīngk'lī*, HENRY: donor to education: 1803, Nov. 9—1888, Aug. 9; b. Barrington, N. H.; descendant of Samuel W., who came to this country 1680, and settled in Kittery, Me. He was educated in Pembroke Acad.; learned in Boston the crockery business, which he afterward carried on largely in New York and Philadelphia as importer, 1831–52. Retiring, he travelled; and later lived in Philadelphia, for its milder climate. There he died. He was not married. His unsolicited donations while living and in his will, amounting to \$385,000, he distributed among evangelical New England colleges and theol. seminaries, which he said were the chief sources of good to this country. Dartmouth, Bowdoin, Williams, and Amherst colleges, with Yale Univ. and Andover Theol. Seminary, were the chief beneficiaries.

WINNEBAGO, *wīn-ē-bā'gō*, LAKE: lake in Wisconsin, on the e. boundary of Winnebago co., and partly in Fond du Lac co.; length n. to s. about 30 m., greatest width 11 m.; 220 sq. m. This lake, in connection with Fox river, entering on its w. side and flowing from its n. end, is an important commercial water-way, and is navigated by steam-boats. The principal towns on Lake W. are Oshkosh, Fond du Lac, and Menasha.

WINNEBAGOES, *wīn-ē-bā'gōz*: tribe of N. American Indians, of the Dakota group. They called themselves Hochungara (trout tribe) and Horoji (fish-eaters). The name W., given to them by the Algonkins, has been variously interpreted as referring to the foul odor of the fish remains around their habitations, and as denoting their traditional migration from the fetid, that is, salt water, meaning from the Pacific. The name was apparently

## WINNER—WINNIPEG.

transferred to W. Lake, in Wis., where, and in Iowa, they lived after being driven from the vicinity of Green Bay. They fought against the English 1763; with the English against the United States 1812; and against the settlers in the Black Hawk war. In 1848, when they numbered 2,531, they were removed to a reservation on Blue Earth river, Minn.; in 1863 to Crow Creek, Dak.; in 1864 to Nebraska; a few, however, remained in Wis., supporting themselves. In 1890, at the reservation near Omaha, the W. numbered 1,215—617 males, 598 females. In 1900 they numbered about 1,170. The 'ration Indians' of this tribe numbered 61. No separate statistics are given of the Winnebagoish at the Leech Lake reservation in Minnesota.

WIN'NER, WIN'NING, WIN'NINGLY: see WIN.

WINNIPEG, *wĩn'ĩ-pěg*: city of the Dominion of Canada, cap. of the province of Manitoba; at the confluence of the Assiniboine with the Red river; 50 m. s. of Lake Winnipeg; lat. 49° 56' n., long. 97° 7' w. A post of the Hudson's Bay Company, called Fort Garry, was established here 1820, and the village which grew up in the neighborhood was known by that name until 1873, when the city of W. was incorporated. W. is built on the prairie. The principal buildings are the govt. offices, city hall, post-office, custom-house, the several chartered banks, and about 20 churches. The main street, 132 ft. wide, is block-paved, traversed by a street railway, and lighted by electricity. The assessed value of the real estate (1901) was reported about \$22,361,650. The Univ. of Manitoba includes a Presb., an Episc., a Rom. Cath., and a medical college. W. stands on the line of the Canadian Pacific railway, and is connected through the Red River valley (and on both sides of the river) with the railways of the United States. W. is a city of great prospective importance. Its railway connections, e., w., and s., with a northward line toward Hudson's Bay partly built, give it facilities as a centre of extensive trade. In 1882 the pop. doubled in a few months, there was enormous rise in values, and speculation became wild. This undue inflation was followed the next year by a collapse, and a general prostration of business enterprises, with rapid diminution of the population. But the city has risen again and entered on a career of great prosperity. Pop. (1881) 7,985; (1886) 20,238; (1901) 42,340

WINNIPEG, LAKE: large lake of Brit. N. America; 90 m. n. of the state of Minn., about 350 m. n.w. of Lake Superior; 50°—54° n. lat., 96°—100° w. long.; 264 m. long, 35 m. broad; 9,000 sq. m. It is 628 ft. above sea-level. It is connected by navigable channels with Lakes Winnipegosis (q.v.) and Manitoba (q.v.), which lie to the w., and almost parallel to it. Its tributaries drain 400,000 sq. m. Of these, the largest is the Saskatchewan (q.v.), which flows e. from the Rocky Mts. through a rich alluvial country, and joins Lake W. near its n. extremity. The Winnipeg river, 300 m. long, flowing n.w., connects Lake W. with the Lake of the Woods (q.v.) and with Rainy Lake (q.v.).



## WINNIPEGOSIS—WINNOW.

The Red River of the North (q.v.) and its great branch, the Assiniboine (q.v.), discharge their waters at the s. extremity of Lake W., after flowing through a region to the s. and s.w. which presents a singular and important combination of prairie and woodland. Nelson River (q.v.), issuing from the n. end of Lake W., is its principal outlet.

WINNIPEGOSIS, *wîn-î-pe-gō'sis* (or WINNIPEGOOS, *wîn'î-pe-gós*, or LITTLE WINNIPEG), LAKE: in Brit. N. America, about 50 m. w. of Lake Winnipeg; length n. to s. about 120 m., average width 25 m.; about 2,000 sq. m. Red Deer and Swan rivers and Lake Dauphin discharge into it; and its outlet is through Water Hen river, Lake Manitoba, and the Little Saskatchewan river into Lake Winnipeg. It is not deep, but is navigable by vessels drawing 10 ft. of water.

WINNIPESAUKEE (or WINIPISIOGEE), *wîn-î-pe-saw'-kê*, LAKE: largest lake in N. H., and largest wholly within New England—except the lakes in Me.; about 25 m. n.e. of Concord, in Belknap and Carroll cos.; length 19 m., extreme breadth  $8\frac{1}{4}$  m.; though, as the lake is exceedingly irregular in form, its water-area (about 72 sq. m.) is less than these dimensions would represent—extensive bays, partly separated from the main body by islands or peninsulas, indenting the shores on every side. This irregular outline gives remarkable picturesqueness to the scenery, which in many parts is of wonderful beauty, especially as viewed from the steamboats which navigate the lake: the scene constantly changes—the shores now receding and opening far among the hills, now suddenly closing in as if to dispute the course. Mt. Washington and other mountains are visible from the lake. The depth in general is not great, probably nowhere more than 200 ft.; though in many places the shore is formed by high steep hills. The shore-line is about 183 m. in length. The islands of all sizes number 274: many are beautifully wooded. Lake W. is about 500 ft. above sea-level. Its waters are remarkably pure and clear. The outlet is on the n.w. shore, at The Weirs—through the Winnepesaukee river and its expansions, Lake Paugus, Round Bay, Winnisquam Lake, etc.—to Franklin, where it unites with the Pemigewasset river (whose waters come from Lake Asquam and from the Franconia Mts.) to form the Merrimac. The name, which is said to have been spelled in 131 different ways, is of Indian origin, meaning 'The Beautiful Water of the High Place.'

WINNOW, v. *wîn'nô* [AS. *windwian*, to winnow—from *wind*, wind (see WIND): OHG. *wintōn*, to blow gently backward and forward: Bav. *windel*, a fan]: to expose to a current of air in order to remove the chaff from; to separate from the chaff by means of the wind or by a current of air; to separate by fanning; to sift; to examine; in *OE.*, to beat as with the wings. WIN'NOWING, imp.: N. the act of separating the chaff from grain. WIN'NOWED, pp. *-nôd*. WIN'NOWER, n. *-ér*, one who or that which winnows,



## WINNOWING-MACHINE—WINSLOW.

WINNOWING-MACHINE: see FANNERS: BLOWING-MACHINES.

WINONA, *wĩ-nō'na*: city, cap. of Winona co., Minn.; on the Mississippi river, and on the Chicago and Northwestern, the Chicago Milwaukee and St. Paul, the Chicago Burlington and Northern, the Green Bay Winona and St. Paul, and the Winona and Southwestern railroads; 27 m. n.w. of La Crosse, 104 m. s.e. of St. Paul, 297 m. w.n.w. of Chicago. It has a beautiful and healthful site, and ranks high among the younger cities of the w. in commercial and manufacturing importance. It is attractively laid out, well built, lighted with gas and electricity, provided with water-works (22 m. of mains), paid fire dept., street railways, and in 1902 had bonded debt \$381,000, and an assessed property val. \$7,087,900. There were 2 nat. banks (cap. \$425,000), 2 state banks, 1 private bank; and 1 daily, 7 weekly and 3 monthly periodicals. Conspicuous among its buildings were the State Normal School (cost \$140,000), U. S. govt. bldg. (cost \$150,000), co. court-house (cost \$130,000), 2 high schools (cost \$55,000 and \$35,000), 4 grammar schools (cost \$150,000), State Soldiers' Orphans' Home, city-hall, public library, hospital, and 22 churches. Principal articles of commerce are grain and lumber, for manufacturing which there were flour-mills of 1,500,000 bbls. capacity annually. Other manufactures were barrels, 5 steam-factories; sash, doors, and blinds, 5 factories; wagons, 1 factory, annually producing 5,000 wagons; carriages, 3 factories; agric. imp.; indurated fibre; foundry products; tanned leather; blank books, etc.—in all employing about 2,000 persons. The first white settlement was made at W. 1851; the town was laid out 1852; and it received a city charter 1857. Pop. (1880) 10,208; (1890) 18,208; (1900) 19,714.

WINSEY, *n. win'sĩ*: a variant of WINCEY (q.v.).

WINSLOW, *wĩnz'lō*, EDWARD: governor of Plymouth colony: 1595, Oct. 18—1655, May 8; b. Droitwich, England. Meeting with the Rev. John Robinson in Leyden, he united with the church of the exiles there, and sailed with the first Pilgrims in the *Mayflower*. The next year he was commissioned to make a treaty with Massasoit; in 1623 he was the means of restoring that sachem from severe sickness, and for reward received information of an Indian plot to destroy the profligate Weston colony at what was afterward named Weymouth. This led to the expedition by Capt. Miles Standish, the Plymouth colonists fearing that an attack on themselves would follow. The same year, 1623, W. visited England, and brought to the colony 1624 the first cattle. He was elected asst. gov. every year 1624–47, except 1633–36 and 1644, when he was governor. In 1624 he again visited England, to secure evidence against a preacher, John Lyford, who had been sent to the colony and had written slanderous letters to the old country. In 1633 he sent a vessel to settle disputes with Dutch traders on the Connecticut river, and the vessel, passing the Dutch fort,

established a post on the site of the present city of Hartford. On his third visit to England, 1635, to defend the colonies against certain accusations, he was imprisoned nearly 4 months through the influence of Abp. Laud. He was commissioner 1643 in organizing the confederation known as the United Colonies of New England. His fourth visit to England, 1646, was on an errand similar to those previous, and resulted, moreover, in the incorporation by parliament of the Soc. for the Propagation of the Gospel in New England among the Indians. He remained in England until 1654, when he was a commissioner on claims against Denmark for injuries to English trade, and also was chief of the commission under Cromwell which sailed with an expedition against the Spaniards in the W. Indies. On the way from Santo Domingo to Jamaica, W. died of fever, and was buried at sea. He was remarkable for business ability, for skill in managing negotiations, and for a more tolerant spirit than was general among leading men in his time. His residence from 1637 was on the ground afterward occupied by Daniel Webster at Marshfield. Besides his part in *Bradford's and Winslow's Journal* (1622), relating to the first year of the colony, he wrote a further account, *Good Newes from New England*, known also as *Winslow's Relation* (written 1623-4). His *Hypocrisie Unmasked*, and *New England's Salamander*, were answers to defamers of the colony. Besides letters, his other remains include *The Glorious Progress of the Gospel among the Indians of New England* (1649), and *A Platform for Church Discipline in New England* (1653).

WINS'LOW, EDWARD FRANCIS: soldier and railroad official: b. Augusta, Me., 1837, Sep. 28. In 1856 he removed to Iowa and became interested in railroad construction. He entered the army 1861; promoted col. 1863; served in the campaign against Gen. Joseph E. Johnston; was appointed chief of cavalry by Gen. Sherman, and held cavalry commands in the campaign against Gen. Leonidas Polk and in the pursuit of Gen. Sterling Price. He was brevetted brig.gen. vols. 1864, Dec. 12, commanded a brigade in the movement against Selma and Montgomery, and took Columbus, Ga., by assault 1865, Apr. 16. After the war, he engaged in railroad building; became vice-pres. and general manager of the Manhattan elevated railroad, New York, and unified the system 1879; but resigned 1880, Mar., to become pres. of the St. Louis and San Francisco railroad and vice-pres. of the Atlantic and Pacific railroad. He has been pres. of the New York Ontario and Western railroad, and formed the company which built the West Shore road.

WINS'LOW, HUBBARD, D.D.: author and Congl. minister: 1799, Oct. 30—1864, Aug. 13; b. Williston, Vt.; brother of the Rev. Miron W. He graduated at Yale 1825, and studied theology at Andover Theol. Sem. and at Yale; was Congl. pastor at Litchfield, Conn., 1827-8; Dover, N. H., 1828-31; the Bowdoin St. Church, Boston, 1832-44; conducted the Mount Vernon Institute, Boston, 1844-53; ministered to the 1st Presb. Church, Geneva, N. Y., 1857-



59; and afterward was pastor of the 50th St. Presb. Church, New York. He died in his native place. In 1837-8 he edited the *Religious Magazine*, and he lectured frequently. Among his many publications were: *Doctrine of the Trinity* (1831); *Controversial Theology* (1832); *Philosophical Papers* (1833); *Christianity applied to Civil and Social Relations* (1835); *Young Man's Aid to Knowledge* (1836); *Natural Science and Revelation* (1841); *Intellectual Philosophy* (1852); *Moral Philosophy* (1856); and *The Hidden Life* (1863). His tract *Are You a Christian?* had a distribution of 250,000 copies, and some of his books a wide circulation.

WINS'LOW, JOHN: soldier: 1702, May 27—1774, Apr. 17; b. Plymouth, Mass.; great-grandson of Gov. Edward W. of Plymouth colony. He served as capt. in the Brit. expedition against Cuba 1740; was commissioner to Fort St. George, Me., to adjust disputes with the Indians 1752; and under orders from Gen. William Shirley removed the Acadians from Nova Scotia 1755. As maj.gen. he commanded the forces at Fort William Henry on Lake George 1756, and served as maj.gen. in the Kennebec expedition against the French 1758-9. He became judge of the court of common pleas in Plymouth co. 1762, assisted in determining the e. boundary of Me., and was active in the Stamp Act controversy. Winslow, Me., is named in his honor.

WINS'LOW, JOHN: soldier of the revolution: 1753, Oct. 29—1819, Nov. 29; b. Boston. He was the first to find the body of Gen. Joseph Warren on the field of Bunker Hill after the battle. Receiving the appointment of deputy paymaster-gen., he was in service at the assault on Quebec 1775, and at the battle of Ticonderoga 1776, on both occasions saving the army treasure and papers from capture. In the operations against Burgoyne he was in command of a battery, and was afterward at West Point and White Plains. In 1799 he commanded a Boston brigade, and 1809 was maj.gen. of state militia. He was treasurer of the Soc. of the Cincinnati, and 1812-19 of Suffolk co., Mass. To him is ascribed the preserving of the communion service of the Old South Church in Boston, from the hands of the British, at the beginning of the revolution. He died in Boston.

WINS'LOW, JOHN ANCRUM: naval officer, victor over the Confederate cruiser *Alabama*: 1811, Nov. 19—1873, Sep. 29; b. Wilmington, N. C.; descendant of a bro. of Gov. Edward W. of the Plymouth colony. From midshipman 1827 he rose to lieut. 1839: had part in the Mexican war, and for gallantry was put in command of a captured vessel; was in various service in the Gulf, at Boston, and on the Pacific, until promoted commander 1861 in the Mississippi flotilla, where he was disabled by an accident. The next year he was made capt., in command of the *Kearsarge*, 7 guns, and blockaded the Confederate *Alabama*, 8 guns, in the harbor of Cherbourg, France. Accepting a challenge by Capt. Raphael Semmes, he fought and sank the *Alabama* 7 m. out at sea, his shots telling severely, while his own ship, having some rude armor-protection





**Whortleberry**  
(*Vaccinium myrtillus*).



**Winter's Bark**  
(*Wintera aromatica*).



**Wrightia tinctoria.**



**Xanthoxylum fraxienum.**

## WINSLOW.

amidships, suffered little, and he had but three men wounded (only one fatally), against 40 of the *Alabama* killed. He fired 173 shots, the enemy 370, in the 80 minutes' duration of the battle. See ALABAMA; THE. He was promoted commodore; received the thanks of congress; commanded the Gulf squadron 1866-7; was on the board of examiners 1868-9; was chief of the Pacific fleet 1870-72; and commissioned rear-admiral 1870. He died in Boston.

WINS'LOW, JOSIAH: governor of Plymouth colony: 1629-1680, Dec. 18; b. Plymouth, Mass.; son of Gov. Edward W. He was member of the general court 1643; asst. gov. 1657-73; gov. 1673-80. Besides these offices, he held that of commissioner of the United Colonies 1658-72; capt. of Marshfield militia 1652; milit. chief of the colony 1659, and was intrepid in seizing a sachem, successor of Massasoit; and gen.-in-chief of the United Colonies 1675, conducting the war against King Philip, while he dealt justly with friendly Indians. He was the first native gov. and the first native general-in-chief in New England. He showed a tolerant spirit twice, officially, in the history of the Quaker persecution. Under his administration the first public school was opened 1674-5. A poem by him commemorating Gov. Bradford was printed in George Morton's *Memo-riall*. He died in the homestead at Marshfield, where he had long dispensed a generous and refined hospitality.

WINS'LOW, MIRON, D.D., LL.D.: missionary: 1789, Dec. 11-1864, Oct. 22; b. Williston, Vt.; descendant of a bro. of Gov. Edward W. He graduated at Middlebury Coll. 1815, and at Andover Theol. Sem. 1818. The next year he went as missionary of the Amer. Board, and founded a mission in Ceylon, and later the Oodooville Seminary. Removing to Madras, India, 1836, he established a mission, seven schools, and a college. His most laborious work was the translation of the Bible into the Tamil language, and the production of a Tamil and English dictionary, mostly original work, and containing 68,000 words and definitions, on which he spent 20 years. He also published *Sketch of Missions* (1819); *Memoir of Harriet Lathrop Winslow*, his first wife (1835); and *Hints on Missions in India* (1856). The memoir of his wife had wide circulation. The *Remains of Mrs. Winslow*, his second wife, was published 1851.

WINS'LOW, WILLIAM COPLEY, D.D., LL.D., D.C.L., PH.D.: archæologist: b. Boston, 1840, Jan. 13; son of Hubbard W., D.D. He graduated at Hamilton Coll. 1862, and from the Prot. Episc. theol. seminary, New York. After brief editorial work in New York, he removed to Boston, where he has since been engaged in researches, preaching at intervals. He has given special attention to biblical archæology, and particularly Egyptology. For the Boston Museum of Fine Arts, he procured a statue of Rameses II., the Pharaoh of the Exodus, which was found among the ruins of Zoar. He has written many articles for reviews and transactions, on his favorite subjects, and has received many honorary degrees, including LL.D. from St. Andrews, Scotland, L.H.D. from Columbia Coll., and D.C.L. from King's College.



## WINSOME—WINTER.

**WINSOME**, a. *wīn'sūm* [AS. *wynsum*, pleasant—from *wyn*, joy: from same root as *win*]: pleasant; merry; gay; light-hearted; comely; fitted to attract or charm; winning. **WIN'SOMELY**, ad. -*lī*. **WIN'SOMENESS**, n. -*nēs*, agreeableness; attractiveness.

**WINSOR**, *wīn'zēr*, **JUSTIN**, LL.D.: bibliographer: b. Boston, 1831, Jan. 2. He was a student at Harvard and at Heidelberg; supt. of the Boston Public Library 1868-77, and, since, librarian of Harvard; first pres. of the Amer. Library Assoc., pres. of the Amer. Hist. Assoc., and sec. of the Mass. Hist. Soc. As librarian and as historical investigator he held high rank. He contributed much to periodicals, and published *History of Duxbury, Mass.* (1849); *Reader's Hand-book of the American Revolution* (1880); and pamphlets, such as Gov. Bradford's hist., Arnold's expedition, the Montcalm spurious letters, manuscript sources of Amer. hist., etc.; also bibliographies of Shakespeare, of Halliwell-Phillips, of Ptolemy's geography, etc.; and he edited library and other publications, including a series of *Biographical Contributions* relating to Amer. history. He died 1897, Oct. 22.

**WINSTED**, *wīn'stēd*: borough in Litchfield co., Conn.; on the Mad river outlet of Long Lake, and on the Central New England and Western and the New York New Haven and Hartford railroads; 26 m. n.w. of Hartford. Mad river has a descent of 200 ft. in 2 m., affording valuable hydraulic power. The borough contains the villages of Winsted and West Winsted, connected by Main street, 3 m. long, and conforming to the irregular course of the river. The scenery of W. is delightfully diversified. Business houses border the river-bank, and elegant residences dot the picturesque hills. Fire apparatus is confined to hose carriages, the pressure from Long Lake being sufficient to force water over the tallest buildings. Within the borough are 7 churches, 4 banks, 4 graded schools, Rom. Cath. convent, Beardsley Library, and opera-house. The manufactures comprise clocks, silk goods, cutlery, scythes, book-leather, pins, wagon springs, agricultural implements, wagon, car, and carriage axles, and hardware. Pop. (1880) 4,195; (1890) 4,846; (1900) 6,804.

**WINSTON**, *wīn'ston*: town, cap. of Forsyth co., N. C.; on the Richmond and Danville and the Roanoke and Southern railroads; 120 m. n.w. of Raleigh. It is in an agricultural region; handles large quantities of tobacco and fruit; manufactures tobacco, wagons and carriages and their parts, cotton and woolen goods, and foundry products; and has 5 churches, graded schools, 2 nat. banks (cap. \$250,000), 1 state bank, and 2 daily and 4 weekly periodicals. Pop. (1880) 2,854; (1890) 8,018; (1900) 10,008.

**WINTER**, n. *wīn'tēr* [Dut. *winter*; Goth. *vintrus*; Dan. *vinter*; Icel. *vetr*; Ger. *winter*, winter; *wetter*, storm, weather: Pol. *wiatr*, wind]: the cold season of the year, astronomically reckoned in n. latitudes from the time when the sun enters Capricorn (about Dec. 21) to the equinox in Mar., but popularly considered in the United States to in-



## WINTER—WINTERGREEN.

clude Dec., Jan., and Feb., and in the United Kingdom Nov., Dec., and Jan.; when it is winter in the n. hemisphere, it is summer in the s. hemisphere (see SEASONS): V. to pass the winter; to feed or manage during winter: ADJ. pertaining to winter. WIN'TERING, imp.: N. the act of passing the winter; the act of keeping or feeding during the winter. WIN'TRY, a. -trĭ, or WIN'TERY, a. -tĕr-ĭ, pertaining to winter; cold; stormy. WIN'TERLY, a. -tĕr-lĭ, suitable for winter; of a winter kind. WIN'TROUS, a. -trūs, in OE., wintry. WINTER-ACONITE, a yellow wild-flower, *Eranthis hiemālis*, ord. *Ranunculaceæ*. WINTER SOLSTICE: see SOLSTICE. WINTER QUARTERS, a station or residence for the winter months. WINTER-TIDE, the winter season.

WIN'TER, WILLIAM: poet and critic: b. Gloucester, Mass., 1836, July 15. After graduation at the Harvard Law School, he engaged in journalism and magazine writing, and for a quarter of a century has been the dramatic critic of the New York *Tribune*. He founded a library at Stapleton, Staten Island, 1886. His criticism is genial and considerate, though unfaltering in its moral tone; and his style has remarkable grace and charm. He published volumes of poems 1854-78, collected in *Poems, Complete Edition* (1881); *Life of Edwin Booth* (1871); *The Jeffersons* (1881); *English Rambles, and Other Fugitive Pieces* (1884); *Henry Irving* (1885); *Stage-life of Mary Anderson* (1886); *Shakespeare's England* (1886); *The Wanderers*, poems (1888); *Shadows of the Stage* (1892); and he has edited the poems of George Arnold, of John Brougham (with his life and stories), and of Fitz-James O'Brien.

WIN'TERBER'RY: one of several N. American shrubs of the genus *Ilex* and nat. order *Aquifoliaceæ*; specifically the *Ilex verticillata*, Black Alder, or Virginian W., which grows to a height of 6 to 10 or 12 ft., and bears deciduous leaves and small white flowers in clusters, followed by shining scarlet berries about the size of a pea (see HOLLY). Another species, *I. lævigata*, or Smooth Winterberry, has larger berries, which ripen earlier and are generally solitary.

WINTERGREEN. win'tĕr-grĕn: any one of several plants of the genera *Gaultheria*, *Pyrola*, or *Chimaphila*, nat. order *Ericaceæ*, which produce succulent berries yielding a fragrant volatile oil. In the United States the name is commonly applied to the Aromatic or Creeping W. (*G. procumbens*), whose bright red berries have the spicy flavor of Sweet Birch. The W. or Shin-leaf (*Pyrola*), of which we have a number of species, has a root-cluster of rounded leaves and a flower-stalk bearing round pods, not berries. The Spotted W. or Pipsissewa (*Chimaphila maculata*), has the leaves variegated with white, and also bears a pod. This and *C. umbellata* have been valued for their tonic, diuretic, and narcotic qualities, and used in dropsy, calculus, stranguy, and other diseases.

## WINTERGREEN—WINTER MOTH.

WIN'TERGREEN, OIL OF: *Gaultheric Acid*, an essential oil yielded by the flowers of the *Gaultheria procumbens* (see GAULTHERIA), consisting chiefly of salicylate of methyl,  $C_6H_4(OH).CO(OCH_3)$ , mixed with a small quantity of a hydrocarbon, termed *Gaultherilene*,  $C_{10}H_{16}$ , which is isomeric with oil of turpentine, and which, being more volatile than the salicylate of methyl, is easily separated from it. The latter is so much the more abundant constituent of the oil, that the two may be regarded as identical. This oil is not only yielded by distillation of other plants, e.g., leaves and flowers of *Monotropa hypopitys*, and the bark of *Betula lenta*, but may be artificially formed by distilling a mixture of 2 parts of crystallized salicylic acid, 2 of anhydrous wood-spirit, and 1 part of oil of vitriol. In whatever mode it is obtained, it presents the appearance of a colorless or yellow oil, of powerful, agreeable, and persistent odor; and hence it is largely used in confectionery, and in disguising unpleasant medicines.

WINTER MOTH (*Cheimatobia brumata*): species of moth, whose caterpillar is very injurious to plum-trees. It has long been well known as common in many parts of the continent of Europe. In the vale of Evesham, in Worcestershire, England, famed for its plum plantations,



Winter Moth, Wingless Female, and Caterpillar.

damage has been done by it to the extent of \$100,000 to \$150,000 in a year. It is an insect about half an inch long, of light-brown color. The male alone has wings. The eggs are hatched early in spring, and the caterpillars, at first very minute, feed on the buds of the plum. The eggs are deposited on trees, chiefly around the base of the buds, and in chinks of the bark. Like most of the moths, this insect is nocturnal. During night the males fly about the trees, and the wingless females creep up their stems. The best mode of preventing its ravages is to surround the stems of the trees with something over which the females cannot climb from the ground, in which they pass their chrysalis stage.

## WINTER'S BARK—WINTHROP.

WINTER'S BARK, *wîn'têrz bârk* [after Capt. *Winter*, who first brought it from the Straits of Magellan 1579]: a stimulant, aromatic and tonic bark resembling cinnamon, the product of the *Drimys Winteri*, or *D. aromatica*, a forest shrub or tree, native of some mountainous parts of S. America, and abundant in the lower grounds of Cape Horn and Staten Island in Tierra del Fuego—an evergreen, with laurel-like leaves, corymbs of white flowers, and many-seeded berries. This shrub belongs to the nat. order *Magnoliaceæ*, and to a section of it called *Winteraceæ*, distinguished chiefly by dotted leaves and aromatic qualities. The Star Anise (*Illicium*) is nearly allied to it. The bark of other species of *Drimys* has similar properties to Winter's Bark—e.g., that of *D. Granatensis*, much used in Brazil as remedy for colic, and of *D. axillaris*, a New Zealand tree.

WINTERTHUR, *wîn'têr-tôr*: town of Switzerland, in the canton of Zürich; on the Eulach; 14 m. n.e. of Zürich. It has a fine town-house, a Reformed and Rom. Cath. church, a gymnasium, and a town library of 20,000 vols. Its situation among hills, many of which are clothed with vines, is specially pleasant. Cotton-spinning, cotton-printing, dyeing, and manufacture of machinery and weapons, are actively carried on.—Pop. (1888) 15,956.

WINTHROP, *wîn'throp*, JOHN: Puritan founder of the Massachusetts colony: 1587, Jan. 12—1649, Mar. 26 [date of birth, new style, Jan. 22]; b. at Edwardston, near Groton, Suffolk, England; only son of Adam W., lord of the manor of Groton. He was admitted to Trinity College, Cambridge, 1602, Dec. 8; was married to a young lady of family and wealth 1605, Apr. 16, whose death, 1615, June, left him with six children; was a second time married, but his wife died with her infant a year later; and 1618, Apr., he was again married, to Margaret, daughter of Sir John Tyndal, who became the mother of eight children, and died at Boston 1647, June 14.

From 1619 to 1629 Winthrop was active in the practice of the law, much of the time under commission as a magistrate or justice. He had early developed a strongly religious bent and a character of much gravity and dignity, modified by remarkable tenderness of affection and warmth of sympathy. About 1629, June, he had to give up his London office as attorney of the court of wards, and his law chamber there. He was already considering the hope dawning upon not a few of escaping vexations and prescriptions by removal to New England. In old England the king was practically exercising despotic authority. Eminent men who opposed forced loans, secret tribunals, and oppression in matters of religion, were imprisoned. Puritanism, with which W., though a member of the Church of England, warmly sympathized, was counted a grievous offense, and was arbitrarily repressed by Laud, then bp. of London, and by other powerful prelates. In 1629, Aug. 26, W. was one of 12 men of family, character, culture, and means, who signed an agreement, at Cambridge, 'to pass the seas, to inhabit and continue in New



England,' on condition that they carry 'the whole government' with them, to maintain a church and state with entire liberty. He had not been one of the earliest in the movement; yet, Oct. 20, he was 'chosen to be gov.,' as he said, 'without my seeking or expectation,' on the ground of his high character and conspicuous qualifications. Embarking at Southampton 1630, Mar. 22, and after detentions getting finally to sea Apr. 8, with about 700 persons in 11 ships, W. touched at Salem June 12, and June 17 sailed into Boston harbor. Sep. 7 names were given to Dorchester, Watertown, and Boston; and Oct. 19 108 persons were admitted freemen. Excessive privations drove a hundred or more to sail back for England, and more than 200 had died before Dec.; but W. wrote: 'I do not repent my coming. I would not have altered my course though I had foreseen all these afflictions. I never had more content of mind;' and the historian of New England can now say that 'during W.'s last ten years, nowhere else in the world had Englishmen been so happy as under the generous government which his mind had inspired and regulated;' and that at his death 'he closed his eyes upon a scene of rare prosperity, which he, laboring with many other good and able men, had been the chief instrument in creating.' He was 12 times elected gov., 1630-33, 1637-39, 1642, 1643, and 1646-48. That he was not continuously chosen was due to his strong insistence on the principle that true liberty requires wise and secure authority. Precisely as Washington and the makers of the constitution of 1787, W. foresaw the folly and weakness of a loose democracy. 'I observe a great mistake in the country about liberty,' he said, and he conceived 'two errors' of an extreme Puritanism to be, electing to office 'men who had no learning nor judgment, though holy and religious,' and allowing 'some one or other of their ministers' to assume 'the main burden for managing of state business.' A few of the ministers, and all the extremists of democracy, in Boston especially, more than once kept W. out of office, but never for long; and when a federal movement created at Boston, 1643, May 19, 'The United Colonies of New England'—Massachusetts, Plymouth, Connecticut, and New Haven—W. was the first pres., and more than any other Puritan founder he embodied for both state and church the broad forethought of combined liberty and law, which, taking its characteristic development in New England, had—in its political bearings—such strength in Washington, and such vindication in Lincoln.—See PURITANS: PILGRIM FATHERS.

W. began, 1630, Mar. 29, on Easter Monday, a week after the sailing from Southampton, a journal designed to serve as annals. Continued to 1649, Jan. 11, vol. I. was published in Hartford 1790; but the continuation was discovered 1816 in the tower of the Old South Church, Boston, and the whole was eventually published as *The History of New England from 1630 to 1649*, with notes, etc., by James Savage (vol. I. 1825; II. 1826; new ed., richer in notes, etc., 1853).

WIN'THROP, JOHN, Jr.: Puritan founder of Connecticut: 1606, Feb. 12—1676, Apr. 5; b. Groton, England; son of John W., who was founder of Massachusetts colony. He was early at school at Bury St. Edmunds; was for several years a student at Trinity College, Dublin; studied law in London, and was admitted to the Inner Temple 1624, Feb. 28; entered the naval service, and was in the expedition to the Isle of Rhé, 1627, June—Sep.; and the next year, after concluding not to sail with Endicott, June 28, to New England, he started, June 18, for a European and oriental trip, to Italy and on to Constantinople, thence to Venice, to Amsterdam, and back to London. Heartily approving, 1629, his father's decisions as to removal to New England, he accompanied his mother and her children (1631, Aug. 15—Nov. 2) to Boston; was chosen one of the magistrates 1632, May; began a settlement at Agawam (Ipswich); went to England 1634, and returned 1635, Oct., 'with commission to begin a plantation at Connecticut, and to be gov. there;' founded the colony at Saybrook; returned the next year to Ipswich; sailed again for England 1641, Aug. 3; returned 1643 to Mass., with stock and men 'to begin an iron-work' (at Braintree); made a plantation at Pequot river 1646; was commissioned a magistrate by Conn. 1647, Sep. 9; became a freeman of Conn. 1650, May, and was chosen a magistrate annually 1651-56; and elected gov. 1657, deputy-gov. 1658, and under a special law re-elected gov. every year until the royal charter came into force, under which he continued gov. to his death. He went to England 1661, as the colony's agent to secure a charter after the Restoration, and obtained one 1662, May 10, which not only gave remarkable liberties, but authorized Conn. to absorb the colony of New Haven, thus extinguishing one of the Union of Four. Gov. W. was an early member and a correspondent of the Royal Soc., London.

WIN'THROP, JOHN, LL.D.: scientist: 1714, Dec. 19—1779, May 3; b. Boston, Mass.; son of Chief-justice Adam W. A graduate of Harvard 1732, and prof. there of nat. philos. and mathematics from 1738 to his death, he was the foremost pioneer of scientific inquiry and teaching in New England, an original investigator in several depts., one whose views were in advance of the science of his time, and a scholar of great acquirements. In 1740 and 61 he observed the transit of Mercury, in the second instance making a journey to Newfoundland, under colony govt. auspices. His observations on comets and on earthquakes were valuable contributions to science. He was several years a judge of probate, was on the gov.'s council 1773-4, and favored the revolution.

## WINTHROP—WINY.

**WIN'THROP, ROBERT CHARLES, LL.D.**: 1809, May 12—1894, Nov. 16: statesman; b. Boston; 7th in descent from John W., the Puritan founder. He was graduated at Harvard 1828, studied law with Daniel Webster, and was admitted to the bar 1831. He served as member of the lower house of the Mass. legislature 1834-40, and as its speaker 1838-40. He was a member of congress 1840-50, and speaker of the house for the term 1847-49. He entered the U. S. senate, by appointment of the gov., 1850, to succeed Daniel Webster, when the latter became sec. of state, but was defeated for re-election, 1851, by a coalition of free-soilers and democrats. Defeated the same year as candidate for gov., he declined further political service, except as he gave the support of his voice in presidential elections, to Scott 1852, to Fillmore 1856, to Bell 1860, and to McClellan 1864. His principal work after his political retirement was his *Addresses and Speeches*, made on special historical and commemorative occasions, and published in four vols. (1852-86). He also published *Life and Letters of John Winthrop* (2 vols. 1864), and *Washington, Bowdoin, and Franklin*. He was the trusted adviser of George Peabody, and was president of the trust for education at the south created by Peabody. He gave important service for 25 years as pres. of the Boston Provident Assoc., and for 30 years filled the post of pres. of the Mass. Hist. Soc. His most notable orations were, 1870, on the landing of the Pilgrims; 1876, the Boston Centennial oration; 1881, the hundredth anniversary of Yorktown; and 1885, on the completion of the Washington monument.

**WIN'THROP, THEODORE**: soldier and author: 1828, Sep. 22—1861, June 10; b. New Haven, Conn.; descendant of Gov. John W. of Conn. He graduated at Yale 1848, and after a year of further study was in Europe for his health 1849-51, part of the time as tutor in the family of W. H. Aspinwall, who brought him into the service of the Pacific Mail Steamship Company, at Panama, 1852. He visited 1853 Cal. and Or., and returned overland to New York. He took part 1853, Dec., in the survey of a canal route across the Isthmus of Panama; and 1854, Mar., began the study of law, and was admitted to the bar 1855. He spent the following years in literary pursuits. At the outbreak of the war some articles in the *Atlantic* were his first literary success, and on his death, in a gallant attack on Great Bethel, Va., his novels and sketches appeared in close succession: *Cecil Dreeme* (1861); *John Brent* (1862, Jan.); *Edwin Brothertoft* (1862, July); *The Canoe and the Saddle* (1862, Nov.); and *Life in the Open Air* (1863). His *Life and Poems* appeared 1884.—W.'s novels show something of inexperience in plot and construction; but much of original genius and refined taste.

**WIN'TON, ANDREW OF**: see WYNTOUN.

**WINY**: see WINE.



## WINZE—WIRE.

**WINZE**, n. *wīnz*: in *mining*, a small shaft sunk from one level to another for the purpose of ventilation or for proving the lode.

**WIPE**, v. *wīp* [A.S. *wipian*, to wipe: Low Ger. *wiep*, a wisp of straw (see **WISP**)]: to clean or dry by rubbing with something soft; to remove by rubbing with or on something; hence, to cleanse from abuses, or from a stain of foulness; with *off* or *out*, to efface; to clear away: N. the act of rubbing or brushing a surface gently for the purpose of cleaning or drying; in *slang*, a blow; a stroke; a crushing repartee; a handkerchief. **WI'PING**, imp. **WIPED**, pp. *wīpt*. **WIPER**, n. *wī'per*, one who or that which wipes, a projecting piece on a horizontal axle, intended to act on a similar projecting part, called the *toe*, of a stamping or pounding mill, which it raises and then lets fall. **To WIPE OUT**, **To WIPE AWAY**, to efface; to obliterate.

**WIPE**, n. *wīp* [Sw. *wipa*]: in *OE.* and *prov. Eng.*, the green plover or lapwing.

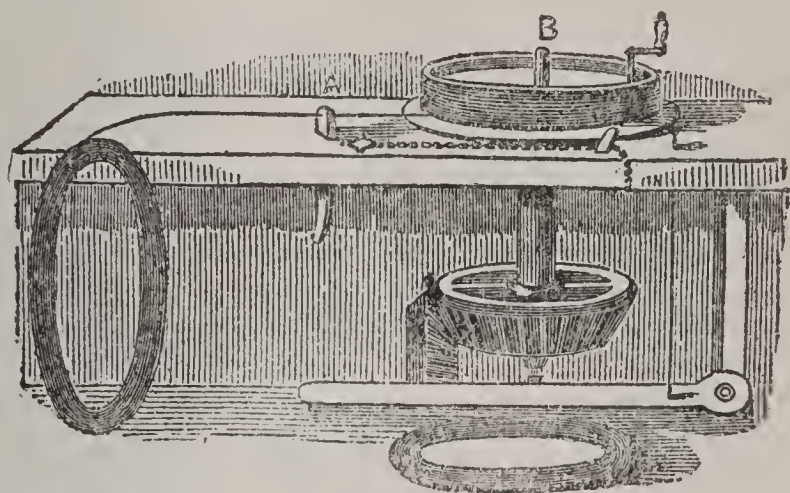
**WIRE**, n. *wīr* [Icel. *virr*; Dan. *vire*; Low Ger. *wire*, wire: Sw. *wira*, to twist: Dan. *virre*, to whirl, to twist]: a piece of metal **drawn into a thread**; the line of wire by which telephonic or telegraphic messages are sent; hence, *familiarly*, the telegraph, as to send a dispatch by *wire*: V. to bind or supply with wire; to capture by a wire; to send a telegraphic message. **WIR'ING**, imp. **WIRED**, pp. *wīrd*. **WIRY**, a. *wīr'ī*, consisting of or resembling wire; tough or sinewy, as a *wiry* frame. **WIR'INESS**, n. *-ī-nēs*, the state or quality of being wiry. **WIRE'DRAW**, v. to draw metal into wire by forcibly pulling it through a series of holes gradually decreasing in diameter; to spin out, applied to language or an argument. **WIRE'DRAW'ING**, n. the act or operation of drawing metal into wire. **WIRE'DRAWER**, one engaged in the business of wire-drawing. **WIRE-GAUZE**, a kind of stiff cloth made of fine wire. **WIRE GUN**, or **WOODBIDGE GUN**, ordnance built up by overlaying a tube with square wire—the interstices filled in with solder or the like. **WIRE-PULLING**, pulling the wires in the exhibition of puppets; secret influence and management over others. **WIRE-PULLER**, one who pulls the wires in the exhibition of puppets; one who powerfully but secretly influences action by others. **WIRE-ROPE**, a rope formed of strands of wire twisted round some core, usually a hempen cord or rope. Wire-ropes are almost always galvanized or coated with zinc. A hemp-rope 6 in. in circumference, and weighing 9 lbs. per fathom; an iron-wire rope 2½ inches in circumference, and weighing 5 lbs. per fathom; and a steel-wire rope 1½ inch diameter, and weighing 3 lbs. per fathom, all are of equal strength—the breaking strain of each being 10 tons. **WIRE-WORKER**, a manufacturer of articles from wire.—

*Wire* is a metal thread formed by drawing a slip of metal through a hole or graduated series of holes; hence the process of making it is called *wiredrawing*.

The facility with which any metal can be drawn into wire depends on its Ductility (q. v.). Most metals have this

## WIRE.

property; but some, like bismuth and antimony, are so brittle that they can be drawn out with difficulty, and wire made from such metals is useless, from lack of tenacity. The metals chiefly used for making wire are iron, brass, copper, silver, platinum, etc., and they all are drawn by essentially the same process. The metal is prepared by cutting up flat rolled plates into rods of a given thickness. This is done by means of a pair of slitting rollers; one of these has grooves, equal to the breadth of the rods wanted,



Wiredrawer's Bench.

fitting into corresponding grooves in the other, which cut the metal like shears. The rods are cleaned of scales of oxide either by mechanical rubbing, or by chemical treatment with dilute sulphuric acid. If the rod is thick, it has its square edge taken off by rollers. It is then forced through the hole of a *draw-plate*. This is an oblong piece of hard steel pierced with conical holes, gradually diminishing in diameter, and having the smallest ends of these tapering holes carefully prepared to the required size. Sometimes cubical-shaped dies, each with a single trumpet-shaped hole, are used. A wiredrawer's bench is shown in the annexed figure, in which A is the drawing-plate, and B the drawing-block or cylinder. The motion is given by means of bevelled wheels connected with a shaft driven by steam or other power.

The workman begins by making a point on the rod, so as to allow it to pass through the hole, and be grasped by a pair of pincers attached to a chain, which draws it out till the length is sufficient to pass round the cylinder. This much is done by hand, and then the cylinder, being put in gear, is made to revolve and pull the wire through the draw-plate—coiling it round itself as the drawing proceeds. After being once drawn, it is passed through a smaller hole, and so the process is repeated till it has been reduced to the size required. Fine wire may require 20 to 30 drawings. The cylinder revolves slowly with a thick wire, and the speed is increased as the size diminishes. After being passed a few times through the draw-plate the metal becomes brittle, and requires to be annealed. Some-



## WIRE-WORM.

times a lubricating substance—as wax, grease, or soap—is needed during the drawing, especially for fine wires.

For some very accurate purposes, such as chronometer-springs, and for gold and silver lace, the wire is drawn through jewelled holes, i.e., through holes perforated in ruby or other hard gem. A silver wire 170 m. long, and about  $\frac{1}{3000}$  of an inch in diameter, has been drawn through a hole in a ruby, and found, by a micrometer, to be of exactly the same size at the end as at the beginning; whereas the drawing of a length of 16 m. of brass wire through a steel draw-plate necessitates a readjustment of the hole.

Platinum wire can be drawn as thin as  $\frac{1}{5000}$  of an inch in diameter by first incasing it in silver, drawing down the compound wire, and then dissolving off the silver with nitric acid. By the same process, gold wire  $\frac{1}{5000}$  of an inch in diameter can be obtained. It is stated, as illustrating the increase of value in a raw material through labor, that 1 lb. of iron, costing perhaps 4 cents, will yield 50,000 wire pendulum-springs for watches, each weighing about one-seventh of a grain, and selling at the retail price of about 4 cents.

Wire, though mostly cylindrical in form, is drawn of many different sections, such as oval, half-round, flat, triangular, molded, and the grooved pinion-wire from which the small toothed pinions for clocks and watches are cut. Copper wire of different forms is used to form patterns in the blocks used by calico-printers.

The following table (given by Tomlinson) shows the weights sustained by wires of different materials 0.787 of a line in diameter: iron, 549 lbs.; copper, 302 lbs.; platinum, 274 lbs.; silver, 187 lbs.; gold, 151 lbs.; zinc, 110 lbs.; tin, 35 lbs.; lead, 28 lbs. Some kinds of brass wire become extremely brittle in the course of time, especially if subjected to vibration.

**WIRELESS TELEGRAPHY:** a system of transmitting messages between distant points without the use of wires, developed by many workers, but particularly identified with William Marconi, who studied the subject with a view to commercial utilization. The earliest experimenter was Wenckler of Leipsic (1746), who transmitted signals a few feet without wire of any kind. In the 19th century Prof. Henry, of Princeton College, and S. F. B. Morse, inventor of the electric telegraph, experimented successfully, and Prof. Dolbear, of Tufts College, transmitted signals by much the same methods as Marconi employed later. In 1864 Prof. Maxwell, of London, defined the difference between waves of light and electricity. In 1888 Prof. Hertz, of Bonn, demonstrated the fact that electric wave motions, like waves of light, can be reflected, refracted and polarized; while beyond this they can pass through rock masses and other intervening substances. Among those who experi-



## WIRELESS TELEGRAPHY.

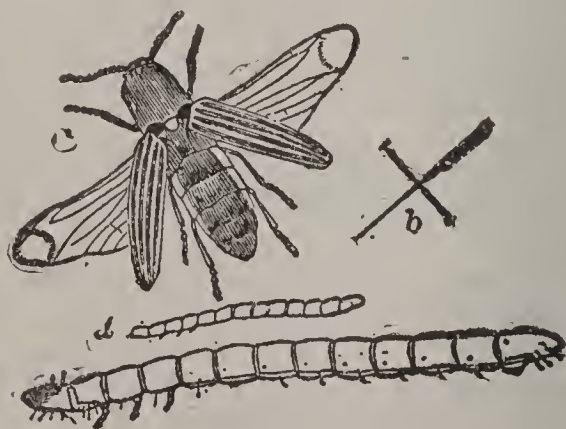
mented with the "Hertzian" rays were Popoff and Iodko, Russians. Marconi, beginning in 1895, improved on the systems of others, and in 1899, communication between England and France was established by his method. In 1901, December, he set up an experimental station at St. Johns, Newfoundland, and on the 14th received signals from Poldu, England. In 1902, March, Marconi, on shipboard, on the Atlantic, received a sentence from Poldu, 1,551 m. distant, and signals at a distance of 2,097 m. Removing to Table Head, Cape Breton, Marconi erected a station, and on 1902, Dec. 21, the first official transatlantic wireless telegrams were sent from there. In 1903, January, President Roosevelt and King Edward VII. exchanged greetings by this new method of transmission. Subsequently Marconi transmitted messages to a distance of over 3,000 m.

In brief, the apparatus has as its essential features an exciter (transmitter) and detector (receiver). As described in 1900, "the transmitter consists of two large solid brass spheres placed side by side; on either side in the same horizontal lines are two small brass spheres, the whole forming one piece of apparatus. From each of the small spheres runs a wire connecting with a Ruhmkorff coil, this in turn being excited by an electrical battery thrown in and out of circuit by a Morse feed. The transmitter in electrical action conveys trains of rapid electric wave impulses into space. These can be reflected, refracted, and if necessary screened off. The detector or coherer (first invented by Prof. Branly of Paris), installed at the receiving station, has as its main features a hermetically sealed tube containing a mixture of nickel and silver filings. When the space waves impinge on the tube the particles agitate themselves and rearrange or cohere, and then decohere, and electrical continuity is set up. This enables the operator to gather up and interpret this electrical force by means of a dot-and-dash signal. If a long, vertical wire is run up from the base line when the receiving apparatus is being worked, the sensitiveness of the coherer to atmospheric waves is enhanced." In his transatlantic work Marconi used a "step-up" transformer, invented by Dr. Lee DeForest, of New York, and a 40-horse-power alternating current dynamo instead of induction coils. The transformer raises the voltage from 2,000 to 20,000, and condensers can increase this to 70,000. A magnetic detector takes the place of the coherer and is connected with a telephone receiver by which the speed of receiving and sending messages is greatly increased, from 40 to 50 words per minute being sent. Originally a single wire, raised by a kite was used, but at the Marconi stations copper cables 250 ft. long suspended from high towers are employed. Syntonic or "tuning" devices for ensuring secrecy have been invented, but up to the end

## WIRELESS TELEGRAPHY.

of 1903 were but partially successful. The distance to which the signals can be sent is a question of power, and depends on the generating apparatus. The agency is most effective over marine areas; on land the potency of the vibrations is reduced. Electrical disturbances are their only foe. The signals carry further at night than in the day time. Of the various systems of W. T. that of Popoff is used in the Russian navy. France and Germany have adopted the Slaby-Arco system which Marconi claims to be an infringement of his patents. Italy and England use the Marconi system and this has been installed on many war vessels of the United States. The DeForest system is used at several U. S. forts and at Annapolis. The Marconi W. T. Co. of America has stations at South Wellfleet, Cape Cod, and at Chicago and Milwaukee, a ship-reporting station at Sagaponack, L. I., also stations in Cuba and Alaska. Including those on ships there are about 70 Marconi stations in all parts of the world. More than 30 transatlantic steamers are equipped with instruments, and now report their safe arrival a day ahead of getting into port.

A "Wireless Congress" was held in Berlin in 1903, at which it was resolved (1) that all coast stations must receive and dispatch to their destinations messages from passing ships whether or not the system employed by the ship be the same as that on land, telegrams referring to wrecks have preference; (2) that stations be established so as to interfere with each other as little as possible.



Wire-worm:

*a*, perfect insect, magnified; *b*, natural size of perfect insect; *c*, wire-worm, magnified; *d*, natural size of wire-worm

**WIRE'-WORM:** name given by farmers and gardeners to the larva of one of the *Elateridæ*, the Snap-bugs, Spring-beetles, or Click-beetles (q.v.), which are long and hard, like pieces of wire, and often swarm in grain-fields, gardens, and pastures, feeding on the roots of crops, and doing great mischief; though some of the species live on the

larvæ of other insects, or on decaying vegetables or wood. The worms of *Melanotus communis* and *Agriotes mancus* are among the commonest species injurious to wheat and corn fields and to pastures in this country; and several species of *Agriotes* are pests in Great Britain.

Among the means for preventing injury to crops by this pest are: fall plowing, lightly coating the seed with tar, applying gas-lime to the soil in the autumn before it is to be planted, and trapping the worms by scattering freshly sliced potatoes on the ground, collecting the pieces every morning and destroying the worms found therein. The burning in the fall of grass and weeds in fields from which the crops have been removed, also is recommended; and repeated plowing or harrowing of the land in early spring has sometimes proved beneficial. Moles, crows, various small birds, and domestic poultry destroy many of these pests. The name W. is often very vaguely used, to include not only the larvæ of some moths, but even myriapods of the genus *Julus* (q.v.), which somewhat resemble the true wire-worms in form, though in reality very different, and probably not injurious to crops. See Fitch's 11th Report in the N. Y. State Agric. Reports, 1866-7.

WIRT, *wért*, WILLIAM, LL.D.: orator and author: 1772, Nov. 8—1834, Feb. 18; b. Bladensburg, Md.; son of a Swiss father and German mother. After four years at school with the Rev. James Hunt, and nearly two years of teaching and study in the family of Benjamin Edwards, in Md., young W. began legal practice at Culpeper Court-house, Va. His marriage, 1795, to a daughter of Dr. George Gilmer, and residence with the latter near Charlottesville, brought him into a circle of acquaintance including Jefferson and Monroe. On the death of his wife, 1799, he removed to Richmond, and was there clerk of the house of delegates, and later, 1802, held for six months the office of chancellor of the e. dist. of Va. After an experiment, 1804-06, of residence at Norfolk, he returned to Richmond, and became a leader at the bar there. In Burr's trial for treason at Richmond, 1807, Aug., W.'s speech of four hours was an oratorical triumph whose fame has lasted to our time. He served in the Va. house of delegates in 1808, and 1816 became dist. atty. Under Pres. Monroe he held the cabinet position of atty.-gen., from 1817, Oct., and continued to hold it under Pres. J. Q. Adams until 1829, Mar. 4, when he resumed a very profitable practice of the law, and Virginian domestic life, with his second wife (daughter of Col. Gamble), whom he had married 1802. He published *Letters of the British Spy* (1803), and *Sketches of the Life and Character of Patrick Henry* (1817); besides numerous essays, addresses, and orations. His *Life*, by J. P. Kennedy, appeared 1849.

WIS, *wis*: a fictitious verb, which has crept into use as equivalent to 'trow' or 'imagine;' it is, however, a misreading of the OE. *ywis*, *iwis*, certainly, *iwis* being the commonest form, and frequently written in MSS. as *I wis* (see *Iwis*),



## WISBEACH—WISCHEHRAD.

**WISBEACH**, or **WISBECH**, *wis'bēch*: market-town, municipal borough and seaport of England, in that part of Cambridgeshire which is known as the Isle of Ely (see **ELY**); on the Nen; 18 m. e.-n.-e. of Peterborough, about 90 m. from London. W. is a busy and prosperous place. Its principal buildings are the Church of St. Peter and St. Paul, lately restored; the corn exchange, the town-hall, the cattle-market, and the new schools. W. is connected with the Great Eastern, the Great Northern, and the Midland railways. By the Nen, which falls into the Wash 12 m. below W., communication is maintained between this town and the North Sea. The town is generally well built, contains a number of useful institutions, and carries on rope-spinning, brewing, and general trade. Grain, timber, wool, salt, and seeds are exported; wine, deals, oil-cake, slates, and coal imported. There entered (1886) 294 vessels, of 50,721 tons; cleared 286, of 50,812 tons.—Pop. (1881) 9,248; (1891) 9,395.

**WISBY**, *wiz'bī*: seaport-town of Sweden, cap. of the island of Gothland (q.v.); on the west coast, about 130 m. s. of Stockholm. The time of its foundation is unknown, but during the 10th and 11th c. (200 years before the establishment of the Hanseatic League 1241) it was one of the most important commercial cities in Europe. W. has much historical and antiquarian interest. It was a principal factory of the Hanseatic League during the 14th and 15th c. The eastern trade, which during the 11th and 12th c. passed through Russia, and thence down the Baltic to Gothland, centred in W. In 1361 Valdemar III. of Denmark took the town by storm, and, obtained immense booty. This was a fatal blow to the prosperity of the place. The architecture of W. is exceedingly interesting. Its ancient walls and towers exist almost as entire as in the 13th c. The early grandeur of the town is attested by the fact that it contains, well preserved, the remains of 18 churches, dating from the 11th and 12th c. The oldest is the Church of the Holy Ghost, 1046. St. Mary's, 1190, is the only church now kept up for the use of the inhabitants.—Pop. (1880) 6,922; (1890) 7,155.

**WISCHEHRAD** [Old Slav. and Bohem. *wyschekhrad*, Pol. *wyszogrod*]: name of numerous towns and castles in Slavonic countries—e.g., the original residence of the princes of Bohemia, now a quarter of the city of Prague. The word is composed of the root *wys* or *wysch*, high, and *hrad* [Russ. *gorod*; Pol. *gorod*; in some dialects *grätz*], a fort, castle, town. *Hrad* is from the same root as AS. *hreoð*, Eng. *reed*, *rod*, another form being *yerde* or *yard*. It signified primarily a place defended by rods or poles, a palisaded fort, hence a town. See **TON**.

## WISCONSIN.

**WISCONSIN**, *wis-kŏn'sin*: state; one of the United States of America; 30th in order of admission into the Union, 17th under the federal constitution; created a state from the Terr. of W., and admitted 1848, May 29; named from its principal river (F.), 'Ouisconsin,' and believed to mean in Indian 'wild rushing river;' popularly known as 'the Badger State.'

*Location and Area.*—W. is in lat.  $42^{\circ} 30'$ — $47^{\circ}$  n., long.  $86^{\circ} 53'$ — $92^{\circ} 53'$  w.; bounded n. by Lake Superior, n e. by Mich., e. by Lake Michigan, s. by Ill., w. by Io. and Minn.; extreme length n. to s. 302 m., extreme breadth 258 m.; land surface 54,450 sq. m., water surface 1,590 sq. m., gross area 56,040 sq. m. (85,865,600 acres); cap. Madison.

*Topography.*—The general surface is a level plain, with water-sheds in the n. and s., and several elevations in the s.w., the highest being Blue Mound, 1,729 ft. above sea-level. Cliffs form the e. limits of Green Bay and Lake Winnebago, from which the surface slopes e. to Lake Michigan. From the n. water-shed the surface slopes toward Lake Superior and toward the s. The Mississippi river forms the w. boundary for 250 m., and there receives the Wisconsin, Black, Chippewa, and St. Croix rivers, the latter forming a considerable part of the w. boundary. The St. Louis, Bois Brulé, Bad, and Montreal rivers flow into Lake Superior; the Menomonce, Peshtigo, Oconto, Pensaukee, and Fox into Green Bay; and the Manitowoc, Sheboygan, and Milwaukee into Lake Michigan. A canal connecting the Fox and Wisconsin rivers renders navigation possible between Green Bay and the Mississippi. Besides Lakes Superior and Michigan there are Green Bay—a long arm of Lake Michigan—Lake Winnebago, and a number of smaller and pretty lakes, including four around Madison. The n. part of the state is in forest; nearly all the remainder is arable, and much of it very fertile.

*Climate.*—The climate is healthful and without severe extremes; the waters of Lake Michigan moderate the summer heat and winter cold; mean annual temperature  $40^{\circ}$  in the n.,  $45^{\circ}$  in the s.; wind, n.e. in spring, s.w. in summer, w. in autumn and winter; rainfall 23–34 in.; rainfall and melted snow in annual average 32 in.; snow precedes frost in the n.; winters long and cold, but with nearly uniform temperature; springs late; summers short; autumns mild and delightful.

*Geology.*—W. is rich in mineral resources, though but few products have been developed with thoroughness. The principal metallic ores are lead, zinc, iron, and copper, with some gold and silver. Lafayette, Iowa, and Grant cos.—in the s.w.—constitute the lead (galena) region; Dodge, Portage, Wood, Juneau, Bayfield, Ashland, Lincoln, Iron, and Oconto cos. contain the principal iron mines, which yield red and brown hematites, specular hematites, and magnetic ores. Other economic products are brick, potter's, and porcelain clays; cement rock; limestone, for lime, furnace flux, and building purposes; glass-sand; sandstone; granite; peat; asbestos; graphite; kaolin; and various precious stones, such as amethyst, carnelian,

# WISCONSIN.

agate, jasper, garnet, and malachite. Pearls are also found in merchantable quantities in certain streams near s. border. The principal forest growths are basswood, maple, hickory, elm, ash, black walnut, butternut, oak, birch, poplar, hemlock, cedar, and pine.

*Zoology.*—The wild animals include elk, deer, bear, beaver, wolf, wild-cat, porcupine, rabbit, squirrel, mole, bat, and field and shrew mice; birds of prey, gold and bald eagle, several species of hawk, great white owl, and crow, about 200 species of birds frequent to state; game-birds, duck, teal, woodcock, prairie and sharp-tailed grouse, partridge, and quail; and fish, white, lake trout, siscowet, muskallonge, perch, pickerel, and sturgeon.

*Agriculture.*—The following comparison of the United States census reports of 1880 and 1890 and 1900 shows a marked development of the agricultural industry:

Farms.	1880.	1890.	1900.
Number of farms. ....	134,322	146,409	169,795
Acreage of land .....	15,353,118	16,787,988	19,862,727
Value of farms. ....	\$357,709,507	\$477,524,507	\$811,712,319

In 1900 there were 48,218 men employed on farms, who received board and \$10,465,080 in wages; the value of farm implements was \$29,237,010; and that of all products \$157,341,623. The subjoined table shows the acreage, yield, and value of the principal agricultural products in 1900, as compared with 1880:

Crop,	1880		1900.		
	Acreage.	Yield.	Acreage.	Yield.	Value.
Corn .....	1,015,393	34,230,579*	1,504,445	42,425,349	\$ 21,212,674
Wheat . . .	1,948,160	24,884,689*	532,104	9,655,094	5,179,260
Oats .....	955,597	32,905,320*	2,381,900	95,037,810	28,511,343
Rye .....	169,692	2,298,513*	328,552	6,209,633	3,104,816
Barley .....	204,335	5,043,118*	488,421	16,508,630	7,593,970
Buckwheat .	34,117	299,107*	27,603	441,648	260,572
Tobacco . . .	8,810	10,608,423†	48,422	64,885,480	4,541,984
Potatoes . . .	.....	8,516,285*	250,022	28,752,530	9,488,335
Hay .....	1,484,920	1,907,429‡	1,720,318	3,268,604	25,854,658
Beans and peas .....	.....	.....	81,808	1,242,001	.....
Sorghum . . .	.....	314,150—	2,399	160,414	641,444
Cherries . . .	.....	.....	.....	31,067	.....
Apples . . .	.....	1,591,747*	.....	303,373	.....
Berries . . .	.....	.....	6,568	11,903,890	835,119
Butter . . .	.....	33,353,045‡	.....	106,552,649	.....
Cheese . . .	.....	2,281,411‡	.....	79,384,298	.....

\* Bushels; † pounds; ‡ tons; —gallons.

The number of animals reported on the farms 1880 and 1903 was as follows:



# WISCONSIN.

Animals.	Number 1880.	Number 1903.	Value, 1903.
Horses . . . . .	352,428	519,738	\$40,981,046
Mules . . . . .	7,136	4,749	321,100
Milch cows. . . . .	478,374	1,032,955	32,031,935
Oxen and other cattle. . . . .	650,767	1,148,698	17,845,142
Sheep. . . . .	1,336,807	1,473,197	4,476,457
Swine' . . . . .	1,128,825	1,686,885	15,148,227
Total. . . . .	3,954,337	5,866,202	\$110,803,907

*Manufactures.*—The following table gives a comparison of the manufacturing industries in 1880 and 1900; and details of the principal ones, arranged in the order of value of output, in 1900, according to the revised census returns. In 1880 the total capital employed in manufacturing was \$73,821,802, and in 1900, \$330,568,779.

Principal industries.	Estab.	Hands em- ployed.	Wages paid.	Cost of ma- terials.	Value of products.
			\$	\$	\$
Industries 1900	16,187	142,076	58,407,597	208,838,167	360,818,942
Industries 1880	7,674	57,109	18,814,917	85,796,178	128,255,480
Increase. . . .	8,513	84,967	39,592,680	123,041,989	232,563,462
Lumber and mill products, logs and bolts. . . .	1,066	21,701	9,480,011	4,995,114	8,400,695
Flour and grist- mill products. .	717	1,412	717,183	22,753,056	26,327,942
Malt liquors . . .	147	3,904	1,926,730	4,237,454	19,394,709
Tanned and cur- ried leather. . .	42	5,262	2,241,861	16,040,304	20,074,373
Slaughtering and meat-packing . .	11	1,361	560,808	11,850,136	13,601,125
Timber products not manufac- tured at mills.					
Foundry and ma- chine shop pro- ducts . . . . .	272	12,670	6,376,040	10,167,488	22,252,730
Cheese, butter, condensed milk	2,018	1,780	893,499	16,623,859	20,120,147
Iron and steel. .	12	1,921	1,216,850	5,410,066	8,905,226
Planing-mill pro- ducts . . . . .	123	4,377	1,653,319	5,036,773	8,400,695
Agricultural im- plements . . . .	51	3,289	1,625,765	3,290,690	7,886,363
Paper and pulp. .	47	4,240	1,649,010	6,712,749	10,895,576
Furniture . . . .	78	7,775	2,553,595	3,899,134	8,721,823
Boots and shoes. .	40	2,507	821,403	3,170,921	4,791,684
Cigars and cigar- ettes . . . . .	622	1,969	799,281	1,224,417	3,255,676
Malt . . . . .	17	366	209,812	3,174,525	4,089,715
Woolen goods . .	32	861	259,238	899,711	1,435,368
Brick and tile. .	168	1,469	542,015	730,297	1,795,993
Hosiery and knit goods . . . . .	27	2,722	600,495	1,176,146	2,486,813
Saddlery, etc. . .	525	678	270,371	1,077,451	1,906,632
Paving and pav- ing materials . .	47	784	337,324	312,317	847,786
Chewing, smok- ing, and snuff tobacco. . . . .	6	300	103,958	472,735	1,632,354
Confectionery . .	56	749	163,020	985,711	1,570,445
Trunks and val- ises . . . . .	16	1,083	287,389	825,157	1,560,006

## WISCONSIN.

The following is a summary of the manufacturing statistics as reported by the U. S. census 1900. There were in W. 16,187 manufacturing establishments employing \$330,568,779 capital and 142,076 persons, paying \$58,407,597 for wages and \$208,838,167 for materials used, and yielding products valued at \$360,818,942. The most important industry in the state was the manufacture of lumber and timber products. The manufacture of flouring and grist mill products ranked second, and foundry and machine shop products third. The manufacture of paper and wood pulp was also an important industry. The large quantities of spruce, hemlock, and other woods used are furnished by the forests of the state.

In the fiscal year ending 1894, June 30, the collections of internal revenue on taxable manufactures were: Distilled spirits, \$1,179,461.92; tobacco, \$616,073.23; fermented liquors, \$2,712,140.01; oleomargarine, \$8,508; miscellaneous, \$7.40; and penalties, \$1,601.56—total, \$4,517,792.12. The same sources yielded \$4,706,441.62 in the year ending 1895, June 30. In the last period the two collection districts had 955 cigar factories, which used 1,611,712 lbs. of tobacco, and had an output of 83,934,654 cigars; and 79 other tobacco factories, which used 5,110,000 lbs. of leaf, 753,949 lbs. of stems, and 108,185 lbs. of scraps, and had an output of 4,127 lbs. of plug tobacco, 830,910 lbs. of fine cut, 5,514,622 lbs. of smoking, and 990 lbs. of snuff. There were in operation 4 grain distilleries, which used 327,855 bu. of materials, and rectified 1,360,165.60 gals. of spirits, gauged 5,096,150 gals., deposited in warehouse 1,352,223 gals., and withdrew on payment of tax 1,168,982 gals. The aggregate collection of Internal Revenue during the fiscal year ending 1902, June 30, was \$10,029,943.

*Mineral Resources.*—In 1893, W. ranked 7th among the states as a producer of iron ore, the output being 434,629 long tons of red hematite and 4,800 of brown, total 439,429 long tons, valued at \$584,094. Shipments from Ashland and Superior aggregated 1,197,793 long tons. The production of coke was 14,958 short tons, valued at \$95,851, from 24,085 short tons of coal, worth \$72,255. Granite quarries yielded \$133,220, a decrease from \$400,000 in 1892; sandstone, \$92,193; and limestone, \$543,283. Two hydraulic cement works had an output of 494,753 bbl., valued at \$248,326; and 21 out of 24 mineral springs yielded 5,705,212 gals. of water for commerce, valued at \$652,703. In 1894 the output of iron ore declined to 347,501 long tons, valued at \$320,518, a decrease of 91,928 tons from the total of the previous year; yet the state advanced to 6th place in general production and 4th in production of red hematite, and the decrease was less proportionately than in any other state. Three furnaces were in blast during the year, and the production, including spiegeleisen, was 91,595 long tons, against 197,160 (1891), 174,961 (1892), and 131,772 (1893). The shipments, all from Ashland, aggregated 1,738,590 long tons, and the stock on hand at the end of the year was 394,484 tons. In the first half of 1895,



## WISCONSIN.

when 3 furnaces were in blast and 6 out, the production was 53,750 long tons. In 1894 the granite output was valued at \$166,098, all in Green Lake, Marinette, and Marquette cos.; sandstone, \$94,888; limestone \$898,406, quarried in 30 cos., of which \$584,971 was burned into lime, and \$213,435 used in building and road-making. In 1901 the granite output was valued at \$389,953, sandstone \$90,425; limestone \$1,225,448; clay products, brick and tile \$1,234,144, pottery \$13,400, total \$1,247,544; and cement 461,005 bbls., valued at \$184,402.

*Commerce.*—W. has but one port of entry, Milwaukee; and the imports of foreign merchandise there in the year ending 1903, June 30, aggregated in value \$1,682,641, and the exports \$451,629. The entranees from foreign ports in the fiscal year were 7 vessels of 897 tons, and the clearanees, 6 vessels of 7,737 tons. There is, however, a large interstate traffic by the Great Lakes and r.r.

*Transportation.*—The first railway was opened for traffic 1850 with 20 m. of track, and the subsequent growth of mileage has been: 1860, 905; 1870, 1,525; 1880, 2,135; 1890, 5,612; 1895, 6,016; 1901, 6,619. The various roads represented a total capital investment of over \$316,000,000, of which nearly \$118,000,000 was in stock, and over \$193,000,000 in funded debt. The cost of roads and equipment exceeded \$300,000,000. Gross earnings, including over \$9,000,000 from passengers and \$34,000,000 from freight, average about \$46,000,000, and net earnings about \$16,000,000. Water communication is facilitated by a canal connecting Lake Michigan with Green Bay. A second one, connecting the Wisconsin and Fox rivers, has lost its former importance and is (1896) rarely used. Both canals belong to the U. S. govt.

*Finances.*—Through the observance of severe constitutional restrictions against debt-making and many years of conservative financial management, the state had no public debt 1896. Its total indebtedness, aggregating \$2,251,000, was in state trust funds, viz.: public school fund \$1,563,700; normal school fund \$515,700; state university fund \$111,000; and agricultural college fund \$60,600. During the biennial fiscal term ending 1894, Sep. 30, the receipts of the general fund were \$3,835,479.08; disbursements \$3,498,391.49; receipts of the trust funds \$4,124,403; disbursements \$4,208,233; all balances omitted. In 1894 the assessed valuations were: Real estate, \$1,226,376,973; personal property, \$227,969,027—total, \$1,504,346,000; state tax rate \$1.546; taxes raised, \$2,519,068. In 1903, April, the state had no indebtedness except the trust funds which aggregated \$2,251,000.

*Banking.*—Official reports for 1895, Oct. 31, showed that there were 81 national banks in operation and 41 in process of liquidation. The active banks had a combined capital of \$10,755,000; U. S. bonds on deposit \$2,978,500; circulation, issued \$17,146,220, redeemed \$14,387,144, outstanding \$2,759,076; loans and discounts \$21,890,958; depositors 41,713, deposits \$21,019,053; reserve required \$3,152,858, and reserve held \$5,821,614. During year the



# WISCONSIN.

exchanges at the United States clearing-house in Milwaukee aggregated \$239,549,926, an increase over the previous year of \$15,291,330. There were 125 state banks with combined capital of \$6,969,350; and 110 private banks with capital \$1,376,696. In 1902 there were 87 national banks (cap. \$12,161,000), 185 state banks (cap. \$6,609,100), and 142 private banks (cap. \$1,379,460).

*Religion.*—According to the revised census report on statistics of churches issued 1895, W. had in the census year 3,722 religious organizations, 3,286 church edifices (and 482 halls used for religious purposes), 556,355 communicants, and church property valued at \$14,521,341. The following table gives in detail the denominational statistics, omitting halls in column of 'edifices':

Denominations.	Organizations	Edifices.	Members	Value of church prop.
Advent .....	79	55	2,541	\$40,375
Reg. Bapt., N.....	192	180	14,152	838,945
Freewill Bapt.....	48	42	1,683	94,400
Other Bapt .....	10	9	1,078	26,725
Brethren, Plymouth.....	2	....	74	.....
Rom. Cath.....	646	620	249,164	4,859,950
Other Cath.....	4	3	665	13,320
Christadelphian.....	1	....	15	.....
Christians .....	25	15	579	5,955
Christ. Scientists.....	16	1	474	2,025
Ch. of New Jerusalem...	2	....	43	.....
Congregationalists.....	182	196	15,841	1,089,750
Disciples of Christ.....	24	18	1,317	30,300
Dunkards.....	6	....	199	.....
Evang. Assoc.....	224	172	12,553	355,100
Friends.....	3	2	154	1,100
Ger. Evang. Synod .....	63	58	11,410	182,700
Jewish congregations....	8	6	1,231	112,000
Latter-day Saints.....	7	3	341	1,200
Lutheran, Gen. Synod...	11	8	861	17,600
Lutheran, Gen. Council..	85	66	10,072	158,925
Lutheran, Syn. Confer...	388	331	83,942	1,306,303
Luth. Ind. Synods.....	410	352	66,044	845,310
Meth. Episc.....	706	623	41,360	1,791,900
Meth. Prot .....	1	1	12	400
African Meth.....	5	4	268	40,400
Other Meth.....	72	44	2,056	56,500
Moravians....	19	16	1,477	27,900
Presb., N.....	131	138	11,019	877,400
United Presb.....	7	8	432	10,455
Welsh Calvinist.....	41	52	2,641	114,500
Ref. Presb .....	1	1	62	2,000
Prot. Episc .....	133	117	10,457	1,035,978
Reformed.....	70	71	7,765	191,950
Salvation Army.....	14	....	322	.....
Spiritualists.....	3	....	354	* 27,000
Theosophical Soc.....	1	....	9	.....
United Brethren.....	51	45	1,750	39,275
Unitarians.....	16	14	1,394	238,500
Universalists.....	15	15	544	85,200

\* 3 halls.

The Rom. Cath. Church has the archdiocese of Milwaukee and the dioceses of Green Bay and La Crosse, and the Prot. Episc. Church the dioceses of Milwaukee and Fond

du Lac. The Rom. Cath. diocese of Marquette and Sault Ste. Marie, Mich., is under the jurisdiction of the archbishop of Milwaukee.

At the tenth international Sunday-school convention, held in Denver, Col., 1902, June 26-30, there were reported in W. 6,768 evangelical Sunday schools, 22,880 officers and teachers, and 447,617 scholars—total members 471,722.

*Education.*—The annual statement of the U. S. commissioner of education 1902, Sep. 1, gave the following statistics concerning the public schools for the school year 1901-2: Number of pupils enrolled in the public schools, 446,247; number in average daily attendance, 278,805; teachers, male 2,403; female 10,753; total 13,156; average number of days the schools were kept, 160; and total expenditure, excepting payments on debt, \$5,493,370. There were 7,242 school buildings and 228 high schools. State normal schools were maintained at Milwaukee, Oshkosh, Plattsville, River Falls, Stevens Point (organized 1894), and Whitewater, and there were also the National Ger.-Amer. Teachers' Semi. at Milwaukee and the Cath. Normal School of the Holy Family at St. Francis. For higher education there were 10 col. and univ., with 330 professors and instructors, 4,090 students (males 3,030, females 1,060), 162,874 vols. in the libraries, scientific apparatus and libraries valued at \$721,296; grounds and buildings valued at \$2,684,098; productive funds \$1,687,053; and total income (1900-1) \$718,034. These institutions were: Lawrence Univ., Appleton, 1849 (Meth. Episc.); Beloit College, Beloit, 1846 (Congl.); Gale College, Galesville, 1854 (Presb.); Univ. of W., Madison, 1848 (non-sect.); Milton College, Milton, 1867 (Seventh-day Bapt.); Marquette College, Milwaukee, 1881 (Rom. Cath.); Ripon College, Ripon, 1854 (Congl.); Racine College, Racine, 1852 (Prot. Episc.); Seminary of St. Francis of Sales, St. Francis, 1856 (Rom. Cath.); and Northwestern Univ., Watertown 1865 (Luth.). The principal secondary schools under private endowment are: Albion Acad., Albion (Seventh-day Bapt.); North Wis. Acad., Ashland (non-sect.); Wayland Univ., Beaver Dam (Bapt.); Evansville Sem., Evansville (Free Meth.); Home School, Hillside (non-sect.); Univ. School, Kenosha (non-sect.); Wis. Acad., Madison (non-sect.); Acad. of Lourdes, Marinette (Rom. Cath.); Cathedral Institute (Prot. Episc.), Concordia College (Luth.), German-English Acad. (non-sect.), and Milwaukee Acad. (non-sect.), all in Milwaukee; St. Lawrence College, Mt. Calvary (Rom. Cath.); Home School (Prot. Episc.) and St. Catherine's Acad. (Rom. Cath.), both in Racine; Catholic Normal School of the Holy Family, St. Francis; St. Clara's Acad., Sinsinawa (Rom. Cath.); Univ. of Our Lady of the Sacred Heart, Watertown (Rom. Cath.); Carroll College, Waukesha (Presb.); Downer College, Fox Lake (Congl.); and Mission House, Franklin (Ref.). In 1895, July, Milwaukee and Downer colleges were merged under the title of the Milwaukee and Downer College and located at Milwaukee. Instruction in law and pharmacy is provided by



the Univ. of W.; and in theology by the Luth. Theol. Sem. of the Synod of W., Milwaukee; Mission House, Franklin (Ref.); Nashotah House, Nashotah (Prot. Episc.); Sacred Heart College, Prairie du Chien (Rom. Cath.); and the Sem. of St. Francis of Sales, St. Francis (Rom. Cath.).

*Libraries.*—According to the govt. report on public libraries in the United States of 1,000 vols. and upward each 1900, W. had 165 libraries, containing 987,729 bound vols., and 198,941 pamphlets. The libraries comprised 71 general, 62 school, 15 college, 2 law, 4 theol., 2 public institutions, 3 asylums, etc., 3 scientific, 1 historical, 1 masonic, and 1 society. Local authorities 1895 reported about 100 public, college, and subscription libraries with an aggregate of 600,000 vols., and about 900 small township libraries, organized under a state law and under the supervision of the state educational dept.

*Illiteracy.*—In 1880 there were 965,712 persons 10 years old and upward enumerated, of whom 38,693 were unable to read, and 55,558 unable to write. The percentage of total illiterates was 5.8; of native white illiterates 2.0; and of foreign white illiterates 10.8. In 1890 the number 10 years old and upward enumerated was 1,258,390, of whom 84,745 were classified as illiterates, or 6.7 per cent. Of 1,253,594 whites, 82,984, or 6.6 per cent., were illiterates; of native whites 15,613, or 2.1 per cent.; and of foreign whites 67,371, or 13.4 per cent., were so classified. In 1900 of 2,066,500 whites, 70,385 were classified as illiterates, and of foreign whites 70,385.

*Charitable and Reformatory Institutions.*—Those supported wholly by the state are the insane asylums at Madison and Oshkosh, School for the Deaf at Delavan, School for the Blind at Janesville, Industrial School for Boys at Waukesha, State Prison at Waupun, Home for the Feeble-minded at Chippewa Falls, and the State School for Dependent Children at Sparta; those partially supported by the state are the Insane Hospital, House of Correction, and Industrial School for Girls, all in Milwaukee, and the Wis. Veterans' Home at Waupaca. There are also asylums for the chronic insane in 23 cos., about 70 jails, and over 50 city and co. almshouses. All public and private charitable and penal institutions are under the supervision of the state board of control.

*History.*—The territory embraced within the limits of the present state of W. was first explored by Jean Nicollet, who in 1634 was sent by Frontenac, then gov. of New France, to open trade relations with the Indians occupying the shores of the lake now known as Winnebago. Nicollet parted with the Jesuit priests who started with him at the Isle des Allumettes, and with seven Hurons continued his journey till he reached a prosperous village of Algonquins on the site of the present city of Sault Ste. Marie. After resting awhile here he advanced to the Falls of St. Anthony, then entered the Straits of Mackinaw, descended to Lake Michigan, passed around Point Detour, and went ashore at Bay de Noquet, the n. arm of Green



Bay. From this point he went to the mouth of the Menomonee river, where he held a council with the Indians, and then slowly made his way to the mouth of the Fox river, and landed at a Winnebago settlement. Soon afterward he navigated Lake Winnebago until he reached the mouth of the Fox river, where the city of Oshkosh now stands, and then spent some time in exploring the interior and in visiting Indian tribes, including some in the present state of Illinois. He returned to Quebec in 1635. Twenty-three years afterward, two traders, Radisson and Groseilliers, undertook an exploration of the same region, spending the winter on the islands at the entrance of Green Bay, ascending the upper Fox river in the spring, and making friends with the Indians. Radisson was taken by the aborigines in their canoes up and down many of the rivers now within W., and entered the Mississippi in the summer of 1659. In 1660 the two traders returned to Canada, and in the following year started on a second expedition to W. by way of Lake Superior, reached Chequamegon Bay, and built a fort near the site of Ashland. About 1665, Pere Claude J. Allouez built a bark chapel and established the first Jesuit mission near this fort. The next explorers were Louis Joliet and James Marquette, who 1673 navigated a part of the Fox and Illinois rivers while on their way to and from the exploration of the Mississippi river. In the meantime the region 'bounded on the one side by the Northern and Western seas and on the other side by the South Sea,' then regarded as a part of the territory of Canada and subject to its laws, was formally occupied in the name of King Louis XIV. The treaty of Paris 1763 gave the territory here claimed by the French to Great Britain, and in that of 1783 it was ceded to the United States. In 1787 congress organized all the region n.w. of the Ohio river and e. of the Mississippi into the Northwest Territory. In 1809 the area of the present state was included in the limits of Illinois, and in 1818 in those of Michigan, which then also comprised the present states of Iowa and Minnesota and the greater part of the two Dakotas. Congress organized the Terr. of W. 1836, April 20; the first govt. under the act was established at Mineral Point in July; the first legislature met at Belmont in Sep.; and the seat of govt. was permanently established at Madison 1838, Nov. The first state constitutional convention was held 1846, and in the following year congress passed an act providing for the admission of the territory into the Union under the constitution framed 1846; but when that compact came before the people for ratification they took such exceptions to a banking clause in it that they rejected the whole draft. A second convention framed a constitution which received popular support 1848, Mar., and the territory was admitted as a state under it May 29, the first state legislature meeting in June following. Although ceded to the United States by Great Britain 1783, and brought under the territorial form of govt. 1787, the region was not wholly free from British domination till about 1815, and it was not till after the close of

the Black Hawk (q.v.) war, or about 1833, that it was relieved of Indian troubles and became tranquil. Excluding the original colonies, W. is one of the richest of the states in historical literature. Its chronology from 1634 is remarkably full, and a long line of historical writers has given the state a record of substantial merit, well-sustained development, and consistent civic pride.

*Government.*—The executive authority is vested by the constitution (1848, amended 1867, 69, 70, and 82) in a gov., salary \$5,000 per annum; lieut.gov., \$1,000; sec. of state, who is also auditor, \$5,000; treas., \$5,000; atty.gen., \$3,500; railroad commissioner, \$3,000; insurance commissioner, \$3,000; supt. of public instruction, \$1,200; commissioner of immigration and the usual subordinate officers—the gov., lieut.gov., sec. of state, treas., atty.gen., and supt. of public instruction—being elected for 2 years each.—The legislative authority is vested in a legislature comprising (1903) a senate of 33 mem., elected for 4 years, and an assembly of 100 members, elected for 2 years, salary of all members \$500 per annum and 10 cts. mileage, without additional pay for extra sessions. The legislature meets (since 1882) biennially, in odd-numbered years, on the second Wednesday in Jan., no limit to sessions. Insane, idiots, convicts, bribers, bettors, and duellists are excluded from voting.—The judicial authority is vested in a supreme court of a chief-justice and 4 assoc. justices, elected for 10 years, salary of each \$5,000 per annum; circuit courts, judges elected for 6 years, salary of each \$3,000 per annum; co. or probate courts, judges elected for 4 years; and justices of the peace, elected for 2 years. There are also 2 U. S. district courts, whose judges receive \$3,500 each per annum.—Legal interest is 6 per cent., by contract 10; usury forfeits entire interest.

The successive gov., with their terms of service, are as follows:

*Territory.*

Henry Dodge.....	1836-41	N. P. Tallmadge.....	1844-5
James D. Doty.....	1841-44	Henry Dodge.....	1845-48

*State.*

Nelson Dewey.....	1848-51	William H. Taylor.....	1874-76
Leonard J. Farwell.....	1851-53	Harrison Ludington.....	1876-78
William A. Barstow.....	1853-55	William E. Smith.....	1878-82
Coles Bashford.....	1855-57	Jeremiah M. Rusk.....	1882-89
Alexander W. Randall.....	1857-61	William D. Hoard.....	1889-91
Louis P. Harvey.....	1861-2	George W. Peck.....	1891-95
E. Salomon (act'g).....	1862-3	William H. Upham.....	1895-97
James T. Lewis.....	1863-66	Edward Scofield.....	1897-19
Lucius Fairchild.....	1866-72	R. M. La Follette.....	1901-05
C. C. Washburn.....	1872-74		

*Counties, Cities, and Towns.*—W. is divided into 70 counties. In 1895 the most populous *counties* were: Milwaukee 287,922; Dane 65,669; Winnebago 57,627; Rock 48,414; Sheboygan 48,396; Dodge 47,851; Fond du Lac 47,436; Brown 45,623; Outagamie 44,404; La Crosse 43,610; Racine 41,110; and Manitowoc 40,802; and *cities and towns*: Milwaukee 249,290; La Crosse 28,769; Oshkosh 26,947; Superior 26,168; Racine 24,880; Sheboygan 21,130; Eau Claire

## WISCONSIN.

13,637; Green Bay 18,290; Appleton 14,641; Fond du Lac 13,051; Janesville 12,971; and Ashland 12,310. In 1900 the chief *counties* were: Milwaukee 330,017; Dane 69,435; Winnebago 58,225; Dodge 46,631; Fond du Lac 47,589; Rock 51,203; Sheboygan 50,346; Brown 46,359; La Crosse 42,997; Outagamie 46,247; Manitowoc 42,261; Grant 38,881; Racine 45,644; Jefferson 34,789; Waukesha 35,229; Eau Claire 31,692; and Sauk 33,006; and *cities and towns*: Milwaukee 285,315; La Crosse 28,895; Oshkosh 28,284; Racine 29,102; Eau Claire 17,517; Sheboygan 22,962; Madison 19,164; Fond du Lac 15,110; Superior 31,091; Appleton 15,085; Marinette 16,195; Ashland 13,074; Wausau 12,354; Green Bay 18,684; Watertown 8,437; and Chippewa Falls 8,094.

*Politics.*—State, congressional, and presidential elections are held on first Tuesday after the first Monday in Nov. Citizens of the U. S. and aliens who have declared their intention of becoming citizens can vote if they have resided in the state one year and in the precinct 10 days. W. had 12 electoral votes under the apportionment on the 1900 census. See PRESIDENT AND VICE-PRESIDENT, ELECTIONS OF.

*Population.*—(1840) white 30,749, colored 196, total 30,945; (1850) white 304,756, colored 635, total 305,391; (1860) white 773,693, colored 1,171, total 775,881; (1870) white 1,051,351, colored 2,113, total 1,054,670; (1880) white 1,309,618, colored 5,879, total 1,315,497; (1890) white 1,680,473, colored 2,444, total 1,682,917; (1900) 2,069,042.



## WISCONSIN.

**WISCON'SIN RIVER:** stream of Wisconsin, rising in the n. centre of the state, and flowing s. and w. to join the Mississippi; length 270 m. A canal, completed 1850, connects with the Fox river; so that there is steamboat communication between Lake Michigan and the Mississippi.

**WISCON'SIN, UNIVERSITY OF:** state institution of learning at Madison, Wis. It was incorporated and located by the territorial legislature 1838, in view of a congressional grant of 46,080 acres for the purpose; and again incorporated by the state legislature, and a board of regents constituted 1848. The state constitution adopted that year provided that all lands granted by congress be converted into a permanent fund for the university. A preparatory dept. was formed 1849, and collegiate classes 1851. The grant of congress was increased to a total of 92,160 acres in 1854, and, to this, 240,000 acres were added under the act of congress, 1862, establishing agricultural colleges, as in some other states, where the proceeds of this grant were given to an appendix of existing institutions. The state made some appropriations for the building of halls, and since 1876 a tax of one-tenth of a mill on the valuation of the state has been a part of the permanent support of the institution. In 1868 a law school was added; and all departments have been open to women since 1867. The college of letters includes an 'ancient classical' course, a 'modern classical' course, and an English course. The college of arts comprises courses in general science and in the technical departments of agriculture, of pharmacy, and of civil, mining, metallurgical, and mechanical engineering. The sciences are taught in a long course and a short one. The long course in agriculture is four years, and requires for admission the same examination as for the general science course; the short course is of 12 winter weeks, open to all in farming pursuits. Veterinary science is taught by a professor. There is a prof. of agriculture, and, in the department that he represents, two chemists, and a director of agricultural institutes; an experiment station is connected with the department. There is also a director of normal institutes; a department of pedagogics; a school of economics; and one of music. Laboratories are numerous, including a machine-shop for work in wood and iron. Besides the usual languages taught, instruction is provided in the Scandinavian languages. The bachelor's degree is conferred in arts, in science, and in letters; and the master's degree on those who complete a course of post-graduate study. In 1901-2 there were 187 prof. and instruc., 2,810 stud. (2,201 in col. of letters and science, 225 in college of mechanics and engineering, 219 in college of agriculture, 226 in college of law, 14 in school of pharmacy), and a board of 14 regents having general management. The univ. grounds comprise about 350 acres along the shore of Lake Mendota, and contain over 20 buildings, of which 10 are stone and 6 brick. The various libraries contain 250,000 vols.; the productive funds aggregate over \$500,000; and the total income 1894 was

# WISDOM—WISE.

\$575,000. A new law building was erected 1893 (cost \$86,000) and a gymnasium and armory 1894 (cost \$116,000).—President, Edwin A. Birge (acting).

WIS'DOM: see WISE 1.

WIS'DOM, Book of: one of the books of the Old Test. Apocrypha, in which it appears as the *Wisdom of Solomon*: see APOCRYPHA.

WISE, a. *wīz* [Dut. *wijs*; Dan. *viis*; Ger. *weise*; Goth. *weis*; Icel. *viss*, wise (akin to WIT, which see)]: having the power of discerning and judging correctly; knowing how to produce good effects; discreet; having much knowledge; judicious; prudent; grave; fitted to produce good effects, as *wise* measures or *wise* counsels; becoming a wise man; skilful in hidden arts or witchcraft; pious: N. in *OE.*, wisdom. WISDOM, n. *wīz'dūm*, the right use or application of knowledge; power of judging rightly; judicious conduct; prudence; sound judgment; piety. WISE'LY, ad. *-lī*. WISE'NESS, n. *-nēs*, in *OE.*, wisdom. WISE'-HEARTED, a. knowing; skilful. WISDOM TOOTH, *popularly*, one of four large back teeth—the last molar on each side of each jaw—which do not generally appear till from the twentieth to the twenty-fifth year (see TEETH).

WISE, n. *wīz* [Ger. *weise*, way, method: F. *guise*, manner, fashion: from same root as WISE 1, the transition being from *wisdom*, *skill*, to the *manner* of doing a thing]: way; manner; mode; guise: now seldom used except as a postfix denoting 'manner, way of being or acting,' as *any-wise*, *likewise*, *sidewise*, etc., or in such antiquated or colloquial phrases as—IN NO WISE, in no way: IN ANY WISE, in any way: ON THIS WISE, on this manner, etc.

WISE, *wīz*, HENRY ALEXANDER: statesman: 1806, Dec. 3—1876, Sep. 12; b. Drummondstown, Accomac co., Va. He graduated at Washington College, Penn., 1825; studied law at Winchester, Va.; settled and married at Nashville, Tenn., but two years later returned to his native county, and engaged in politics. In 1825 advocated the nomination of Gen. Jackson at the Baltimore convention; opposed nullification, but maintained the state-rights doctrines of Jefferson and Madison as expressed in the Virginia resolutions of 1798, that 'each state for itself is the judge of the infraction of the constitution, and of the mode and manner of redress.' Elected to congress 1833, he was involved in a duel with his opponent, whose arm he fractured. On the removal of the govt. deposits by Gen. Jackson, W. went over to the opposition or whig party, but was sustained by his constituents, over whom he had unbounded personal influence. In 1837 he was the second in a lamentable duel in which Graves, member of congress from Ky., shot Jonathan Cilley, an esteemed member from Me. In 1840 he secured the nomination of John Tyler as vice-pres.; and on Tyler becoming pres. by the death of Gen. Harrison, W. had a powerful influence in his administration. Nominated minister to France, he was rejected by the senate, but confirmed for Brazil, where he resided



## WISE.

until 1847. Now again acting with the democratic party, in 1854, after an arduous electioneering campaign, in which, though in feeble health, he travelled 3,000 miles, and made 50 stump speeches against the 'Know-nothing' or Prot. native American party, he was elected gov. of Va. In 1859 he published a treatise on Territorial Government, maintaining the right of congress over the institution of slavery. In Dec. of that year, he signed the death-warrant of John Brown (q.v.), hanged for treason in attempting to excite a negro insurrection. In 1861, as member of the Virginia convention, he labored for conciliation; but when his state voted for secession, he entered heartily into the war, and was appointed brig.gen., serving in the Kanawha valley, and later defending Roanoke Island, where his son was killed. He died at Richmond.

WISE, HENRY AUGUSTUS: naval officer and author: 1819, May 12—1869, Apr. 2; b. Brooklyn, N. Y.; son of George Stuart Wise, of the U. S. navy, and cousin of Gov. Henry A. Wise, of Va. He was educated at Philadelphia; entered the navy 1834, Feb. 8; became passed midshipman 1840, July 16; was promoted to master 1846, Oct. 31; lieut. 1847, Feb. 25; served during the Mexican war on the Pacific station; in the coast survey 1850-52; in the Mediterranean 1852-54; and at Boston and Washington 1854-60. In the civil war he served off Charleston, S. C., 1861; was promoted commander 1862, July 16, and assistant chief of the bureau of ordnance and hydrography 1862-69; with rank of capt. from 1866, Dec. 29. He married, 1848, a daughter of Edward Everett. He published *Los Gringos* (1849); *Tales for the Marines* (1855); *Scampavia's* (1857); *Gray African Parrot* (1859); and *Captain Brand* (1860).

WISE, ISAAC MAYER: Jewish rabbi: b. Steingrub, Bohemia, 1819, Apr. 3. He was educated at Prague and at Vienna; appointed rabbi of Radnitz, Bohemia, serving 1843-46; came to America 1846; settled at Albany, N. Y., 1846-54; then at Cincinnati, where he has held a conspicuous position as a liberal Jewish minister and a representative of reform in Amer. Judaism. He secured a union of Hebrew congregations favoring reform, and has been pres. of a Hebrew union college. His *Minhag America*, a special ritual for Jewish use, has been widely adopted. As a writer and lecturer, his activity has been constant and effective. His published works are: *History of the Israelitish Nation* (1854); *Essence of Judaism* (1860); *Doctrines and Duties of Judaism* (1862); *Martyrdom of Jesus* (1874); *The Cosmic God* (1876); and *History of the Hebrew Second Commonwealth* (1880).

WISE, JOHN: patriot Congregational clergyman: 1652, Aug.—1725, Apr. 8; b. Roxbury, Mass. He was graduated at Harvard 1673, and settled for life as minister in Ipswich 1683, Aug. 12. In 1688 the boldness with which he took the lead in opposing arbitrary taxation under Gov. Andros was visited with imprisonment, deprivation of office as minister, and a fine of £50 and costs. The town paid the fine for him, and sent him as representative to Boston. He



## WISE—WISEMAN.

went 1690 as chaplain in the expedition to Canada. His greatest distinction rests on his publications of 1710, *The Churches' Quarrel Espoused*, and 1717, *Vindication of the Government of the New England Churches*, in which he thoroughly demolished a scheme, championed by the Mathers, for establishing associations of ministers authorized to govern the local churches in the Presbyterian way. These writings served very widely as an effective exposition of democracy in both church and state.

WISE, JOHN SERGEANT: lawyer and politician: b. 1846, Dec. 25, at Rio Janeiro, Brazil; son of Gov. Henry A. Wise. He was educated at a milit. institute in Va., took part while a cadet in the battle of Newmarket, Va., served on Confederate staff duty through the war, then returned to study of law at the Univ. of Va., was admitted to the bar 1867, and settled in practice at Richmond. He was U. S. dist. atty. 1882-3; was elected to congress 1882 for one term, and 1885 was republican candidate for gov. of Va., defeated by Fitzhugh Lee.

WISEACRE, n. *wiz'ā-kēr* [Ger. *weissager*, a prophet—not from *weise*, wise, and *sagen*, to say, but a corruption of OHG. *wizago*, a prophet, from *wizan*, to see—parallel to AS. *witega*, a prophet—from *witan*, to see]: one who makes undue and foolish pretensions to great wisdom; a would-be-wise person; a fool; a simpleton.

WISEMAN, *wiz'man*, NICHOLAS, D.D.: cardinal and Rom. Cath. abp. of Westminster, England: 1802, Aug. 2—1865, Feb. 15; b. Seville; of an Irish family settled in Spain. He was brought to Ireland in childhood, and received his first education at Waterford, whence he was removed to the Rom. Cath. college of St. Cuthbert at Ushaw, near Durham. In his 16th year he entered as an ecclesiastical student the English College at Rome, and after a very brilliant course received holy orders at Rome 1823, was given the degree D.D., and was appointed vice-rector of the English College, and prof. of oriental languages in the Univ. of the Sapienza. In 1828 he published his *Horæ Syriacæ*, and in the end of that year was named rector of the English College. In this office he delivered his *Lectures on the Connection of Science and Revealed Religion* (2 vols. 8vo 1836). In England he became known first by lectures on *The Doctrines of the Catholic Church*, at Moorfields Church, published in two vols. 1836. In the same year he established, in concert with O'Connell, the *Dublin Review*, a journal which has since been the quarterly organ of the Rom. Cath. body. In 1840 he was named coadjutor vicar-apostolic of the central district of England, with the title Bishop of Melipotamus *In Partibus* (q.v.) *Infidelium*. At the same time he was appointed pres. of St. Mary's College of Oscott, where he made his residence. W.'s remarkable abilities as a polemical writer came into prominence in the dissensions in the Church of England during the Tractarian controversy; and he issued various lectures, pamphlets, reviews, essays, etc. In 1846 he was transferred as coadjutor vicar-apostolic to the

London district, and 1849 became acting vicar. In 1850 he became still more notable during a change in the position of the Roman Church in England, which, for a time, occasioned great religious excitement. From the reign of Elizabeth, the sees in England having been occupied by bishops of the Established Church, and it being penal for a bishop of the Rom. Cathr. Church to officiate under a territorial title in England, the Rom. Catholics, for the necessary religious ministrations of their church, had resorted to the well-known expedient of a system of bishops *In Partibus* (q.v.) *Infidelium*, with the title and authority of Vicars-apostolic. This form of church govt., with some modification, had subsisted from the time of James I.; but from the date of the passing of the Rom. Cath. Emancipation Act, a desire had arisen among Rom. Catholics for restoration of the normal form of church govt. by the appointment of regular bishops. This measure was finally determined on by the pope 1850, and a new distribution of the kingdom was made into 12 sees (one of them archiepiscopal), in which, in order that it might not be supposed to clash with the Anglican episcopal system, the names of the ancient sees were carefully avoided, the titles of the new bishops being taken exclusively from cities and towns which were non-episcopal. Dr. W. was named abp. of the see of Westminster, which included great part of the district already under his charge, and he was at the same time created cardinal. This measure, for which the Prot. public were not prepared, and which was made more formidable by the language employed, though following the established canonical forms and bearing only on the spiritual concerns of the Rom. Catholics, was supposed to involve an invasion of the rights and dignities of the Established Church and of the crown, and roused a storm of religious excitement unexampled in the memory of the living generation. While this excitement, much influenced by a letter addressed by the prime minister to the bp. of Durham, was at its height, the new cardinal, who had gone to Rome to receive the cardinal's hat, returned to England, and published an explanatory address of great ability and moderation, yet firmly asserting the strictly constitutional rights of the members of his church, entitled *An Appeal to the Reason and Good Feeling of the People of England on the Subject of the Catholic Hierarchy*. This address, with lectures subsequently delivered by him, and extensively circulated, did much to mitigate the excitement, which nevertheless led to violent debates in parliament, and to the passing of an act prohibiting the use of ecclesiastical titles other than those recognized by the law: see ECCLESIASTICAL TITLES ASSUMPTION ACT. Notwithstanding these unfavorable circumstances, the abilities and literary eminence of Cardinal W. eventually compelled the admiration of the British public. He took frequent occasion, moreover, by public lectures and addresses on the neutral subjects of education, literature, and art, to place himself on the side of progress and with the national sentiments of Englishmen; and notwithstanding the infirm.



## WISE MEN FROM THE EAST—WISHART.

ity of his constitution, which began to fail soon after his return to England as cardinal, he published a succession of works whose earnest Rom. Cath. bias did not prevent their commending themselves to the sympathies of cultivated Englishmen. The *Lectures on Religion and Science* already referred to; *On the Connection between the Arts of Design and Those of Production*; on the *Influence of Words on Thought and Civilization*; on the *Points of Contact between Science and Art*; *Recollections of the Last Four Popes*, and similar works, obtained an extensive circulation; and through these, and through the reaction from what was soon felt to have been an exaggerated alarm, W. gained the respect of the public at large. He was a scholar of rare and various attainments, an eminent linguist, an orator, a graceful and vigorous writer, and an accomplished critic of art. In addition to the works mentioned above, he published, among many other books and essays, *Fabiola, or a Church of the Catacombs*, a singularly lifelike picture of early Christian life in classic Rome; and *Sermons* (2 vols. 8vo 1864). He also left many MSS. In 1866 appeared *The Witch of Rosenburg, a Drama in Three Acts*; and (1868) *Daily Meditations*.

WISE MEN FROM THE EAST, THE: see MAGI.

WISH, *n.* *wish* [AS. *wyscan*, to wish: Icel. *óska*, desire: Ger. *wunsch*, wish]: desire; eager desire or longing; an expression of desire in respect of something, or in regard to some one, as good *wishes*; the thing desired, as, I have got my *wish*: V. to desire; to be disposed or inclined; to long for; to call down upon; to imprecate; in *OE.*, to recommend. WISH'ING, *imp.* WISHED, *pp.* *wisht*. WISH'ER, *n.* *-ér*, one who wishes. WISH'FUL, *a.* *fûl*, having or showing a desire; eager; earnest; longing. WISH'FULLY, *ad.* *-lî*. WISH'FULNESS, *n.* *-nês*, the state or quality of being wishful.

WISHART, *wish'ért*, GEORGE: early Scottish Reformer: d. 1546, Mar. 1. He is supposed to have been a native of Forfarshire, son of James W. of Pittarrow. W. emerges into notice in the beginning of the 16th c., when, as teacher of a grammar school at Montrose, he made himself remarkable by introducing the study of Greek. He began also to preach the doctrines of the Reformation; but was obliged to flee to England. He is traced at Bristol about 1538, preaching the same doctrines; but being seized and threatened with death, he publicly recanted. Later he was at Cambridge, in the centre of the Anglican Reform movement under Bilney and Latimer. About 1543 he returned to Scotland. He appears to have had great power as a preacher. Knox (see KNOX, JOHN) gives in his *History*, Book I., a striking description of the effects of W.'s preaching, whose most important effect was on Knox himself, who became his personal attendant. His activity and influence were too prominent long to escape notice. Cardinal Beaton (q.v.) had had his eye on him; and while W. rested at Ormiston, after preaching a powerful sermon at Haddington, he was made prisoner by the Earl of Both-



## WISHAW—WISSEMBOURG.

well, was conveyed to St. Andrews, and immediately put on trial before an ecclesiastical tribunal. He was condemned to be burned at the stake; and the sentence was executed before the castle or episcopal residence at St. Andrews.

Beaton's own death took place about three months after W.'s martyrdom, in accordance, it is said, with the prophecy uttered by W. at the stake. This has appeared to some recent writers to strengthen the suspicion, otherwise suggested, of W. having been accessory to a plot for assassinating the cardinal. On this whole question the evidence is not decisive.

**WISHAW**, *wish'aw*: police burgh of Lanarkshire, Scotland; 15 m. s.e. of Glasgow. The town is irregularly built, though there are some fine streets. The neighboring coal fields are extensive, and more than one million tons are annually shipped. It has also numerous iron-works, fire-clay works, and a distillery.—Pop. (1891) 14,869.

**WISH-WASH**, *n. wish-wōsh* [imitative of the sound of the dashing of a thin watery liquid]: any weak thin drink, in the sense of not being of the proper quality or strength. **WISHY-WASHY**, *a. wish'ī-wōsh'ī*, thin and pale, said of liquid; not of the proper strength or quality, as a liquid; without force or solidity: *N.* a liquor weak and watery.

**WISMAR**, *vis'mâr*: seaport of Mecklenburg-Schwerin, Germany; at the head of the Bay of W., an inlet of the Baltic. Its harbor is the best on the Baltic coasts, and is furnished with ship-building docks. Its old fortifications have been removed; but many of its old buildings, exceedingly curious and picturesque, remain. Commerce, the fisheries, tobacco and sail-cloth manufactures, and agriculture are principal employments; there are also breweries and distilleries. W. is the terminus of a branch of the Mecklenburg railway, and has communication by steamers with Copenhagen. There entered (1888) 461 vessels, of 79,605 tons; cleared 477, of 82,998 tons.—Pop. (1880) 15,518; (1885) 16,011; (1890) 16,787.

**WISP**, *n. wisp* [OE. *wisp*, *wips*: Low Ger. *wiep*, a wisp: Ger. *wisch*, a bunch of something for wiping (see also **WHISK**)]: a small bundle of straw or hay, or the like substance; a Will-o'-the-wisp (*q. v.*).

**WISSEMBOURG**, *vīs-sōng-bôr'* (German *Weissenburg*, *vīs'sén-bûrch*): town of the German province of Lower Alsace since 1871, but prior to that time a fortified town of France; on the Lauter; 34 m. n.n.e. of Strasburg. It has an evangelical and a Rom. Cath. church, a gymnasium, and a tribunal of justice; and manufactures of hosiery, hats, leather, lucifer matches, etc., and a large lithographic establishment. The first great battle of the Franco-German war was fought here 1870, Aug. 4. Besides the fortifications of W., demolished 1872, the Lines of W. are famous—a line of works extending 9 m. s.e. to Lauterburg.—Pop. (1885) 5,968.

## WIST—WISTARIA.

WIST, v. *wĭst* [AS. *wiste*, knew, was conscious, pt. of *witan*, to know: Ger. *wissen*, to know (see also WIT)]: in *OE.*, pt. and pp. of the verb *wit*, to know, knew; was conscious; imagined. WISTFUL, a. *wĭst'fŭl* [said to be a corruption of *wishful*]: full of thought; attentive; pensive; earnest; longing. WIST'FULLY, ad. *-lĭ*, attentively; earnestly. WIST'FULNESS, n. *-nĕs*, the state or quality of being wistful. WIST'LY, ad. *-lĭ*, in *OE.*, attentively; earnestly.

WISTAR, *wĭs'tĕr*, CASPAR, M.D.: physician and anatomist: 1761, Sep. 13—1818, Jan. 22; b. Philadelphia, Pa.; son of a noted merchant, Richard W., whom the Friends disowned for supporting the war of the revolution. He was graduated in medicine at the Univ. of Penn. 1782, spent 1783 in England, went thence to Edinburgh, and there received his degree 1786. On returning to Philadelphia 1787, he became one of the Dispensary physicians, was prof. of chemistry and the institutes of medicine in the College of Philadelphia 1789-92, adjunct prof. of anatomy, midwifery, and surgery 1792-1808, and held the chair of anatomy 1808 to his death, with the highest distinction. He was a member of the Amer. Philos. Soc. from 1787, and its pres., succeeding Thomas Jefferson, from 1815. He published *A System of Anatomy* (1814).—His son, Gen. ISAAC JONES W., has recently given \$135,000 for a museum of his medical objects.

WISTARIA, *wĭs-tā'rĭ-a*: genus of plants of nat. order *Leguminosæ*, sub-order *Papilionaceæ* (or a plant of this genus); having pinnate leaves and flowers in terminal racemes, the pod leathery. The species were formerly included in the genus *Glycine*. Some are among the most magnificent ornamental climbers known in cultivation. *W. frutescens*, Va. to Ill. and s., has beautiful racemes of



*Wistaria Chinensis.*

fragrant bluish-purple flowers. *W. Chinensis* or *consequana*, native of China, has larger flowers in pendulous racemes, and its branches run to the length even of 90 ft. In



New York and some other cities it climbs to the roof of four-story buildings, by the help of wire supports, and covers the whole front. It was named after Dr. Caspar Wistar.

WISTER, *wis'tér*, ANNIS LEE (FURNESS): translator of German novels: b. Philadelphia, 1830, Oct. 9; dau. of the distinguished Rev. William H. Furness, D.D., and wife of Dr. Caspar Wister (1817-88), descendant of Caspar Wistar, the first glass-manufacturer in this country, whose grandson of the same name, Caspar Wistar, M.D. (q.v.), was a distinguished anatomist, in whose honor the plant *Wistaria* was named. Mrs. Wister (her name is so spelled) has translated admirably *The Old Mam'selle's Secret* and other excellent novels of Eugénie Marlitt; also those of Hackländer, Lewald, and others. A set of 30 vols. of her German translations was published 1888. She also had part with Dr. Frederic H. Hedge in *Metrical Translations and Poems* (1888).

WIT, v. *wit* [AS. *witan*; Goth. *vitān*; Dut. *weten*; Dan. *vide*; Ger. *wissen*; Icel. *vita*, to know]: to know; to be or become aware; to be informed; now used only in the phrase *to wit*, signifying 'namely,' 'that is to say;' and in a few compounds, as *outwit*; *wit* is the infinitive mood; *wot* is the 1st and 3d pers. of the present indicative, with *wost* (erroneously *wottest*) as the 2d pers. sing. of same tense; *wist* (erroneously *wotted*), pt. pp. To DO ONE TO WIT, to cause one to know. WIT'TINGLY, ad. *-ing-lī*, with knowledge; by design. WIT, n. the power or faculty of knowing; understanding; intellect; the power of associating ideas in a manner new and unexpected, and so connected as to produce pleasant surprise; display of resemblance between dissimilar things, in a ludicrous sense; a man who excels in giving expression to unusual and striking ideas in such a manner as to create amusement or pleasant surprise; sound mind, in plu., as, 'have you lost your *wits*?' soundness of understanding; ingenuity; in *OE.*, imagination. WIT'TED, a. having wit or understanding—usually the latter part of a compound, as *sharp-witted*. WIT'TY, a. *-tī*, possessed of wit; full of wit; facetious. WIT'LESS, a. *-lēś*, destitute of wit or understanding; thoughtless; inconsiderate. WIT'LESSLY, ad. *-lī*. WIT'LESSNESS, n. *-nēs*, the quality of being witless. WIT'TILY, ad. *-tī-lī*, in a witty manner; with an ingenious association of ideas; with artful pleasantness. WIT'TINESS, n. *-nēs*, the quality of being witty. WIT'TICISM, n. *-sizm*, an expression or phrase in which ideas are so unexpectedly associated as to create amusement or pleasant surprise; a witty remark or saying; a phrase or sentence affectedly witty. WIT'LING, n. *-līng*, a pretender to wit. WITS, senses; understanding. TO BE AT ONE'S WITS' END, to have exhausted the last known contrivance or plan; to be at a loss what further step or measure to take. TO LIVE BY ONE'S WITS, to live by shifts and expedients, as one without any regular employment or occupation.—SYN. of 'wit, n.': humor; satire; irony; sarcasm; burlesque; wag; humorist;—of 'witty': sharp; acute; keen; arch; satirical; taunting; ironical.

## WITCH—WITCHCRAFT.

**WITCH**, n. *wich* [AS. *wicce*; Fris. *wikke*, a witch; Low Ger. *wikken*, to soothsay, to divine—from same root as *wizard*]: a person (originally of either sex, but now more particularly a woman) supposed to have supernatural power and knowledge by compact with evil spirits; a sorceress; a fascinating woman: V. to fascinate; to enchant; to bewitch. **WITCH'ING**, imp.: **ADJ.** bewitching; favorable to enchantment or witchcraft. **WITCHED**, pp. *wicht*. **WITCH'CRAFT**, n. *-kräft* [*witch*, and *craft*]: the practices or powers of a witch; supernatural power; enchantment; irresistible fascination. **WITCH'ERY**, n. *-ér-ŷ*, fascination; a powerful and mysterious influence; charm. **WITCH-MEAL**, the pollen or powder of the lycopodium or club-moss, which, from its inflammable nature, is used in theatres to produce a sudden flash or blaze, in order to imitate lightning.

**WITCH'CRAFT**: practice of the black-art. W. is simply the form that the belief in the arts of magic assumed under the action of certain notions introduced by Christianity.

Not a little light is thrown on the original conception of W., and the magic arts in general, by observing the primary meaning of the various terms employed in connection with them. Most noticeable is the number of those terms that come from roots signifying simply *to do, perform*. From this notion the transition is easy to a variety of shades of meaning, as is seen in Lat. *facinus*, which radically signifies a deed [from *facere*, to do], but became restricted to a *bad* deed, a crime. The Greek *εργειν* or *εργειν* (= Eng. work), and the Lat. *facere*, *operari*, were used, without any addition, as denoting to perform sacrifice or other sacred or magical rite. Accordingly, in Low Lat. *factura* signified sorcery; and in modern It. *fattura* = incantation, and *fattucchiera* = a sorceress or witch. Lat. *factum* becomes in Sp. *hecho*, and means a crime; while *hechicero* is a sorcerer, and *hechiera* a witch. The Portuguese *feitico*, magic, also is from Lat. *factum*; and Skr. *kratu*, a sacrifice, is from *kri* (= Lat. *creare*), to make.

The Eng. *witch* is *vicce* in AS. which has also *viccian*, to fascinate, and *viccaneräft*, the art of magic: the Low Ger. dialects have similar forms (e.g., Dutch *wikkerij* = witchcraft); in High Ger. there are no cognate names. These words, as is seen in the Dutch form, have clearly no connection with *witan* (Ger. *wissen*), to know, which is usually given as the root of the English *witch*; and the most probable etymology is that proposed by J. Grimm, who derives them from the Gothic *veihan* (OHG. *wihan*, mod. Ger. *weihen*), which signified to consecrate, but which he infers to have meant primarily to do, make, perform (see *Deutsche Myth.*, pp. 36, 58, 408; *Deutsche Gramm.* III. 181). *Wiht*, or *wicht*, is evidently a derivative from this root, and signified a thing made (Lat. *factum*), a creature, a person, and, in some Teutonic dialects, a demon. A *vicca* was thus a *doer* of sacred or magic rites (compare the 'I'll do, I'll do, I'll do!' of Shakespeare's witches). *Wicked* is a participle from the same root, and signified primarily



## WITCHCRAFT.

bewitched, accursed, hence perverse. *Wizard* is probably a masculine form of *vicca*.

Nearly corresponding to English *witch* were the Lat. terms *saga*, a knowing or wise woman; *strix*, *striga*, a kind of nocturnal bird, hence a witch; *venefica*, literally, a poison-maker, a concocter of drugs. The Ger. *hexe*, O. Dutch *hagetisse*, AS. *hāgtesse*, or *hāgesse* (from which Eng. *hag*), appear to come from *hag*, cognate with Lat. *sagus*. In O. Norse *hagr* signifies dexterous, cunning.

The powers supposed to be possessed by the witches, and the rites and incantations by which they acquired those powers, were substantially the same as belonged to the devotees of the Greek Hecate (q.v.) the Striga and Venefica of the ancient Romans, and the Vala or Wise Woman of the Teutonic pagans. But when, along with the knowledge of the one Living God, the idea of a purely wicked spirit, the enemy of God and man, was introduced, it was natural that to him should be ascribed all supernatural powers not proceeding directly from the true God. This gave an entirely new aspect to such arts: they became associated with heresy; those who practiced them must be in compact with the devil, and have renounced God and the true faith. Previously, if a witch was punished, it was because she had been guilty of poisoning, or at least was believed to have poisoned or wrought some other actual mischief. Now, however, such power was only the power to work evil; and merely to be a witch was in itself a sin and crime that filled the pious mind with horror. This feeling, zealously fostered, first by the Rom. Cath. clergy, and then no less by the Prot., rose to a frenzy that for four centuries filled Europe with shocking bloodshed and cruelty.

Almost all the various notions and practices noticed under the titles MAGIC, DIVINATION, INCANTATION, AUGURIES, CHARM, TALISMAN, ORDEAL, FETICH, EVIL EYE, etc., are embodied more or less prominently in a huge mass of superstitions which formed the creed of W. in its full development: see the above titles; also ASTROLOGY: ALCHEMY. What was new and distinctive in the W. of Christendom was the *theory* of magical arts which it involved. The doctrine of the Devil (q.v.), as finally elaborated in the middle ages, established in the world a rival dominion to that of the Almighty. The Archfiend and his legions of subordinate Demons (q.v.) exercised a sway, merely permitted, no doubt, but still vast and indefinite, not only over the elements of nature, but over the minds and bodies of men—all except those who had been admitted by baptism into the number of the 'redeemed' (see ATONEMENT), and who continued to be guarded by the faith and rites of the church. The faithful could not be led into evil against their will, nor essentially injured in person; but not even they were altogether exempt from diabolic annoyance, for the immunity does not seem to have extended to their belongings. As a strictly logical consequence of this assumed constitution of things, it followed that those mortals who had the gifts of producing

## WITCHCRAFT.

supernatural effects of any kind (and that such gifts had been possessed by individuals in all ages and countries was not for a moment questioned) must derive their power from the Prince of Darkness, and be acting as his agents—always excepting, of course, those miraculous powers which the church herself claimed to exercise in the name of Heaven. Moreover, as the universally coveted powers of fortune-telling, and of controlling the elements for personal benefit or for the hurt of enemies, could not be supposed to be bestowed by a being of the devil's character except as a *quid pro quo*, and as the object dearest to the devil's heart—the very aim and end of his struggle with the kingdom of light—was to win back as many as possible of the souls that had been redeemed from his dominion by the death of Christ, it was natural to conclude that the price that he would demand for his gifts would be a renunciation of Christ and an entrance into his service. Hence it became the established belief that, to acquire the powers of witchcraft, the person must formally sell his or her soul to the devil. The idea of a covenant with the Archenemy was not involved in the early and heathen conception of magic. Originally, magic was identical with the lowest form of religion—that is, Fetichism (q.v.). It was grounded on the idea that certain natural objects and certain rites and observances had, in themselves, a mysterious power of producing wonderful effects; and the art of the magician consisted in the knowledge of these mysterious powers, and in the skill to combine and direct them to special purposes. The effects were not conceived as being produced by the interference of any conscious being—god or devil: on the contrary, a human being could, through magical means, acquire control over supernatural beings. The Hindus carry this notion so far, that they represent some of their sages as practicing austerities and performing sacrifices and other rites, until they can control the gods themselves, and even threaten their destruction together with that of the universe (see VISWÂMITRA). The higher kind of European magic in the middle ages was mixed with what physical science there then was; and the most noted men of the time were addicted to the pursuit, or were at least reputed to be so. So far from deriving his power from the kingdom of darkness, the scientific magician, by the mere force of his art, could compel the occasional services of the Archfiend himself, and make inferior demons the involuntary slaves of his will. A belief, however, had early existed that individuals in desperate circumstances had been tempted to purchase, at the price of their souls, the help of the devil to extricate them from their difficulties (see THEOPHILUS); hence a suspicion began to grow that many magicians, instead of seeking to acquire their power by the laborious studies of the regular art, had acquired it in this illegitimate way. At last, as the system of dualism above mentioned became more complete, the art of magic was wholly diabolized, and a compact with the Evil One was thought to be the sole charter of supernatural power: see FAUST. This transformation took place ear-



## WITCHCRAFT.

lier and more completely (about the 13th c.) in regard to those lower forms of the magical art which constitute witchcraft proper, and which have from ancient times been considered the special province of women. For the chief cause of the prominent part assigned to the female sex in this matter, see MAGIC: moreover, their more excitable temperament renders them peculiarly liable to those Ecstasies (q.v.) which have been associated with the gift of divination from the priestess of the ancient heathen oracle down to the medium of modern spiritualism. Further, when witchcraft came to be prosecuted as heresy, the part assigned to woman in the Scripture account of the Fall led to her being regarded as specially suited to be the tool of the devil. Founded on this circumstance, a constant element of the creed of witchcraft came to be the belief in a carnal intercourse between witches and evil spirits. The devil was supposed to tempt them in the shape of a wooer, and the unholy compact was consummated in carnal fashion.

The bargain was usually in writing, signed with the witch's own blood. She was rebaptized, receiving a new name, and had to trample on the cross and renounce God and Christ (among Roman Catholics, also the Virgin Mary) in forms parodying the renunciation of the devil in the formula of Christian baptism. A mark was impressed on some part of her body; this mark remained forever after insensible, and was one of the means of discovery employed by the witch-finders. The powers conferred by Satan on these covenanted servants of his were essentially the same as had always been attributed to sorcerers; the mode of exercising them was also the same—namely, by charms, incantations, concoctions, etc. The only change was in the theory. These mystic rites, instead of producing their effects by an inherent virtue, were merely symbols by which the witch conveyed her behests to the devil and his ministers, who obeyed them according to the compact. Another difference to be noted is, that the power was directed exclusively to work evil—to raise storms, blast crops, render men and beasts barren, inflict racking pain on an enemy, or make him pine away in sickness (usually done by making an image of wax, and sticking it full of pins, or setting it to melt away before the fire). If a witch attempted to do good, the devil was enraged, and chastised her. A remarkable circumstance is, that witches seem to have been powerless to serve their own interests, for they remained poor and miserable.

A prominent point in witchcraft was the belief in stated meetings of witches and devils by night, called *Witches' Sabbaths*. First anointing her feet and shoulders with a salve made of the fat of murdered and unbaptized children, the witch mounted a broomstick, distaff, rake, or the like, and, making her exit by the chimney, rode through the air to the place of rendezvous. If her own particular demon-lover came to fetch her, he sat on the staff before, and she behind him; or he came in the shape of a goat, and carried her off on his back. At the place of assembly, the archdevil, in the shape of a large goat, with a black

## WITCHCRAFT.

human countenance, sat on a high chair, and the witches and demons paid homage by kneeling to him, and kissing his posteriors. The feast was lighted up with torches, all kindled at a light burning between the horns of the great goat. Among the viands there was no bread or salt; and they drank out of ox-hoofs and horses' skulls; but the meal neither satisfied the appetite nor nourished. After eating and drinking, they danced to music played on a bagpipe, with a horse's head for the bag, and a cat's tail for a chanter. In dancing, they turned their backs toward one another. In the intervals, they narrated to one another what mischief they had done, and planned more. The revel concluded with obscene debauchery; after which the great goat burned himself to ashes, which were divided among the witches, to raise storms with. They returned as they came; and the husband was kept from being aware of the wife's absence by a stick being laid in the bed, which he mistook for her. The places of meeting were always such as had associations of solemnity and awe, derived from tradition or otherwise: the more noted are known to have been places of sacrifice in pagan times (see WALPURGIS-NIGHT).

The *prosecutions* for witchcraft form one of the most deplorable episodes in human history. They show more strikingly than anything else has ever done, on one hand, what relentless cruelty human nature is capable of under a fanatical delusion; and on the other, how little reliance is to be placed on the concurrence of any number of witnesses when any extensive excitement prevails on a subject involving the sentiment of wonder. Multitudes will be found testifying, and testifying honestly, to alleged facts which fall in with the prevailing belief, but have no better foundation than their own heated imaginations.

In the early laws of Rome, the Twelve Tables, there were penal enactments against him who should bewitch the fruits of the earth, or conjure away his neighbor's corn into his own field. A century and a half later, 170 Roman ladies were convicted of poisoning under the pretense of charms and incantations; which led to additional laws against such practices. But in all this, the penalties were directed against those who had done, or were believed to have done, positive injury to another; and this is probably the meaning of the Mosaic law against witchcraft. At all events, in the heathen world, the mere possessing, or being believed to possess, supernatural powers was not in itself a crime. It was feared, no doubt, as being liable to be turned to malicious purposes; but on the whole, magic was deemed a beneficial art, being, in fact, the only form of the healing art known, and in part also the religion of domestic life. This view of the subject continued for many centuries after the reception of Christianity. Constantine, in the 4th c., while ordaining capital punishment for those who practiced noxious charms against the life or health of others, is careful to protect from prosecution all magical means used for good—such as warding off hail.



## WITCHCRAFT.

storms and excessive rains (*Codex Justin.*, lib. ix., tit. 18); and the distinction between *black* and *white* magic was long retained. It was through the prosecutions against heresy, which were systematically organized in the 11th c. (see INQUISITION), that the magic arts came gradually all to be dyed black alike. Together with errors in doctrine, the heretics were almost always accused of magical practices, and their secret meetings were represented as a kind of devil-worship, attended with all kinds of abominations: thus sorcery and heresy became synonymous; and to the dread of supernatural power was added the feeling of pious horror. White magic, no less than black, was now looked upon as the work of Satan; and the counter-charms against the malice of him and his agents were to be sought only in the rites of the church as ministered by the accredited servants of Heaven. The belief in this ecclesiastical white magic was accepted from the Roman Church by the Prot. clergy at the time of the Reformation, and was as zealously cultivated by them as by the Roman priesthood.

Fostered chiefly by the proceedings against heresy, the popular dread of witchcraft had been on the increase for several centuries; and numerous executions had taken place in various parts of Europe. At last Innocent VIII., by his celebrated bull, *Summis Desiderantes*, 1484, gave the full sanction of the church to the prevalent notions regarding sorcery, and charged the inquisitors and others to discover and put to death all practicers of these diabolical arts. Two special inquisitors, appointed for Germany (to which country the bull was specially directed), Heinrich Institor and Jacob Sprenger, with the aid of a clergyman of Constance, Johannes Gremper, drew up the famous *Malleus Maleficarum*, or Hammer for Witches; in which the whole doctrine of witchcraft was systematized, a regular form of trial laid down, and a course of examination appointed by which inquisitors everywhere might best discover the guilty. From this we may date the beginning of the witch-mania proper. The edict of 1484 was subsequently enforced by a bull of Alexander VI. 1494, of Leo X. 1521, and of Adrian VI. 1522—each adding strength to its predecessor, and the whole serving to increase the agitation of the public mind on the subject. The results were dreadful. A panic fear of witchcraft took possession of society; every one was at the mercy of his neighbor. If any one felt an unaccountable illness, or a peculiar pain in any part of his body, or suffered any misfortune in his family or affairs; or if a storm arose, and committed any damage by sea or land; or if any cattle died suddenly; or if any event, circumstance, or thing occurred out of the ordinary routine of daily experience—the cause of it was witchcraft. To be accused was to be doomed; for it rarely happened that proof was wanting, or that condemnation was not followed by execution. Armed with the *Malleus Maleficarum*, the judge had no difficulty in finding reasons for sending the most innocent to the stake. If those accused did not at once confess, they were ordered to be shaved and closely examined for the discovery of devil's marks; and if any

strange mark was discovered, there remained no longer any doubt of the party's guilt. Failing this kind of evidence, torture was applied, and this seldom failed to extort the desired confession from the unhappy victim. A large proportion of the accused witches, in order to avoid these preliminary horrors, confessed the crime in any terms which were dictated to them, and were forthwith led to execution. Other witches seemed to confess voluntarily, being probably either insane, or feeble-minded persons whose reason had been distorted by brooding over the popular witchcraft code.

In Germany the prosecutions were carried to a frightful extent. In the small bishopric of Bamberg, 600 fell victims to the delusion in about four years; and in Würzburg, which is not much larger, 900. In the small district of Lindheim, a twentieth part of the population were sacrificed in the same space of time. Similar accounts are on record regarding the other countries of Europe. In Geneva, in three months (1515-6), 500 persons were burned. In the district of Como, 1,000 were burned in one year (1524), and 100 per annum for several years afterward. In France, about 1520, fires for the execution of witches blazed in every town; and throughout the 16th c. the provincial parliaments were incessantly occupied with witch-trials and enactments against them, especially against that form of the superstition known as Lycanthropy (q.v.: see also WEREWOLF).

In England and Scotland, the witch-mania was somewhat later than on the continent; but when it came, it was little if at all less virulent—the Reformation notwithstanding. The statute of Elizabeth, 1562, first made witchcraft in itself a crime of the first magnitude, whether directed to the injury of others or not; and the act of James VI., in the first year of his reign in England, defines the crime still more minutely: 'Any one that shall use, practice, or exercise any invocation of any evil or wicked spirit, or consult or covenant with, entertain or employ, feed or reward any evil or wicked spirit, *to or for any purpose*; or take up any dead man, etc.; such offenders, duly and lawfully convicted and attainted, shall suffer death.' Many years had not elapsed after the passing of the statute, ere the delusion, which had previously wrought occasional local mischief, became an epidemic frenzy, devastating every corner of England. The poor creatures who usually fell victims are thus described by an able observer: 'An old woman with a wrinkled face, a furred brow, a hairy lip, a gobber tooth, a squint eye, a squeaking voice, or a scolding tongue, having a ragged coat on her back, a spindle in her hand, and a dog by her side—a wretched, infirm, and impotent creature, pelted and persecuted by all the neighborhood because the farmer's cart had stuck in the gateway, or some idle boy had pretended to spit needles and pins for the sake of a holiday from school or work'—such were the poor unfortunates selected to undergo the last tests and tortures sanctioned by the laws, and which tests were of a nature so severe ~~that~~



## WITCHCRAFT.

no one would have inflicted them on the vilest of murderers. They were administered by a class of wretches, who, with one Matthew Hopkins at their head, sprang up in England in the middle of the 17th c., and took the professional name of *witch-finders*. The practices of the monster Hopkins, who, with his assistants, moved from place to place in the regular and authorized pursuit of his trade, will illustrate the tests referred to, and the horrible fruits of the frenzy. From each town which he visited Hopkins exacted the stated fee of 20s., and in consideration thereof he cleared the locality of all suspected persons, bringing them to confession and the stake in the following manner: He stripped them naked, shaved them, and thrust pins into their bodies to discover the witch's mark; he wrapped them in sheets, with the great toes and thumbs tied together, and dragged them through ponds or rivers, when, if they sank, it was held as a sign that the baptismal element did not reject them, and they were cleared; but if they floated—as they usually would do for a time—they were then set down as guilty, and doomed. He kept them fasting and awake, and sometimes incessantly walking, 24 or 48 hours, as an inducement to confession; and, in short, practiced on the accused such abominable cruelties, that they were glad to escape from life by confession. If a witch could not shed tears at command, said the further items of this wretch's creed, or if she hesitated at a single word in repeating the Lord's Prayer, she was in league with the Evil One. After he had murdered hundreds, and pursued his trade for many years—from 1644 onward—the tide of popular opinion finally turned against Hopkins, and he was subjected, by a party of indignant experimenters, to his own favorite test of swimming. It is said that he escaped with life, but from that time he was never heard of again.

The era of the Long Parliament witnessed an increased number of executions for witchcraft, 3,000 persons being said to have perished during that period, by legal executions, independently of summary deaths at the hands of the mob. Witch-executions, however, were continued with nearly equal frequency long afterward. One noted case occurred 1664, when the enlightened and just Sir Matthew Hale tried and condemned two women, Amy Dunny and Rose Callender, at Bury St. Edmunds, for bewitching children. It is stated that the opinion of the learned Sir Thomas Browne, who was accidentally present, had great weight against the prisoners. He declared his belief that the children were truly bewitched, and supported the possibility of such possessions by long and learned arguments, theological and metaphysical. Yet Sir Matthew Hale was one of the wisest and best men of his time, and Sir Thomas Browne had written an able work in exposition of Popular Fallacies. Chief-justices North and Holt were the first individuals occupying high places who had at once the good sense and the courage to set their faces against the continuance of this delusion, and to expose the general absurdity of such charges (1694).

## WITCHCRAFT.

Summary executions, however, continued to be frequent for some years, in consequence of confessions extracted after the Hopkins fashion. In 1716 a Mrs. Hicks and her daughter, aged nine, were hanged at Huntingdon for selling their souls to the devil, and raising a storm by pulling off their stockings and making a lather of soap. With this crowning atrocity, the catalogue of murders in England closes.

In Scotland, witchcraft as a crime *per se* was first made legally punishable by an act passed in the reign of Mary (1563). On coming to execute the functions of majesty, James VI. made numerous official investigations into alleged cases of witchcraft, and derived a pleasure in questioning old women respecting their dealings with Satan. In 1590 James made a voyage to Denmark to bring home his appointed bride, the Princess Anne. Soon after his arrival, a tremendous witch-conspiracy against the happy conclusion of his homeward voyage was discovered, in which the principal agents appeared to be persons considerably above the vulgar. The king had all the accused brought before himself for examination, and even superintended the tortures applied to them to induce confession. One of them, Mrs. Agnes Sampson, declared that one great object with Satan and his agents was to destroy the king; that they had held a great witch-convention at North Berwick for no other end; and that they had endeavored to effect their aim on many occasions, and particularly by raising a storm at sea when James came across from Denmark. The witches demanded of the devil why he bore such hatred to the king, who answered that the king was the greatest enemy he had in the world. On this occasion, 30 persons were executed on the Castle-hill of Edinburgh. These proceedings, no doubt, gave occasion to the famous work on Demonology which James VI. published shortly after. The removal of James to England moderated but did not stop the prosecutions. As the spirit of Puritanism gained strength in Scotland, they again increased. The general assembly was the body in fault on this occasion, and from this time forward the clergy were the great witch-finders in Scotland. The assembly passed condemnatory acts (1640, 43, 44, 45, 49), and with every successive act the cases and convictions increased with even a deeper degree of attendant horrors than at any previous time. At a single circuit at Glasgow, Stirling, and Ayr 1659, 17 persons were convicted and burned for this crime. The popular frenzy seems to have exhausted itself by its own virulence 1661-2. After this period the dying embers of the delusion only burst out on occasions here and there into a momentary flame. The last regular execution for the crime is said to have taken place at Dornoch 1722, when an old woman was condemned by David Ross, sheriff of Caithness. The number of victims in Scotland from first to last has been estimated at more than 4,000.

In the British colonies of New England also, the witchcraft mania raged. As in Scotland and elsewhere, the clergy were the prime movers. Cotton Mather obtained a



special notoriety for his part in this matter. He was considered a prodigy of learning and piety, but his writings and proceedings in regard to the trial and execution of witches, of which he was a chief instigator, show a high degree of the same fanaticism, credulity, and blind cruelty which had long been prevalent among even the highest classes in England. The earliest execution for witchcraft in New England is said to have been 1648: the chief outbreak of the fanaticism was at Salem 1691-2, when 19 persons were hanged (not burned). The next year 50 persons were tried; but only three were convicted, and they received the governor's pardon. A complete revulsion of public feeling soon took place, and the delusion was utterly broken in Massachusetts, though continuing for a time in Europe. For details of New England witch-trials, see No. 141 of *Chambers's Miscellany of Tracts*; and Bancroft's *History of the Colonization*, etc., III. 84.

Dr. Sprenger, in his *Life of Mohammed*, computes the entire number of persons who have been burned as witches during the Christian epoch at *nine millions*.

Throughout the middle ages, it is doubtful if one person could have been found who doubted the reality of witchcraft; and it was not till the middle of the 16th c. that any one had courage to raise his voice against the enormities which the delusion was occasioning. The first, probably, to do so was a physician, J. Weier (*De Præstigiis Dæmonum*, etc.), in Germany 1563. He was followed 1584 by Reginald Scot (q.v.), 'a solid and learned person, beyond almost all the English of that age' (Hallam), who demonstrated the absurdity and impossibility of the prevalent notions. The delusion, however, was still in the ascendant, and found multitudes of defenders, who branded the skeptics as 'Sadducees.' The most prominent of these champions was James VI. of Scotland, who, through his treatise on Demonology (1597), and his activity in the inquisition of cases, is entitled to rank with Pope Innocent and the inquisitor Sprenger, as at the same time a chief enemy and chief encourager of witchcraft. At last the world began to awaken from the horrid nightmare; the feelings of the humane began to be shocked by the continued butchery, and the more intelligent to question, if not the existence of witchcraft, at least the evidence on which the accused mostly were condemned. Advocates took courage to defend a reputed witch; and judges, like North and Holt in England, to throw doubt on the proceedings; and the frenzy gradually subsided all over Europe. Individual cases occurred later on the continent than in Britain. A man was put to death at Würzburg as late as 1749 on a charge of sorcery; and a witch was burned at Glarus, in Switzerland, 1782. Probably the latest instance in Europe of a judicial execution for witchcraft occurred 1793, in the grand duchy of Posen. The laws against witchcraft were formally repealed in England 1736, in Austria not till 1766.

The cessation of judicial proceedings, however, did not at once put an end to popular outrages on supposed witches. In 1751 an aged female pauper and her hus-

band were killed by a mob near Tring, in Staffordshire; and for the murder one of the perpetrators was tried and put to death. Not longer ago than 1863, a reputed wizard was drowned in a pond at the village of Hedingham, in Essex, England; and it was considered worthy of notice that nearly all the 60 or 70 persons concerned in the outrage were of the small-tradesmen class, none of the agricultural laborers being engaged in the affair. Besides such violent outbreaks, striking revelations are frequently made, in the course of judicial proceedings, of how deep-seated and general the dread of witches continues to be throughout the more ignorant strata of European society, especially in rural places; and, concurrent with this, the faith in the skill of certain 'wise men' and 'wise women' (white witches) to counteract their malicious practices. As recently as 1867, a man calling himself Dr. Harris (S. Wales) was committed for trial for duping various persons by persuading them that their ailments were caused by their being 'witched,' and pretending to cure them by giving them written charms to wear.

The belief in magic or sorcery continues to be an energetic belief of the ignorant and degraded all over the world, no matter what their nominal religion is. To the mass of the adherents of Buddhism in central Asia, the lama or priest is merely a wizard who knows how to protect them from the malignity of evil spirits; and, according to Livingstone and other travellers, trials and executions for witchcraft are at this day common throughout Africa, as they were in Europe in the 17th c., and under forms ludicrously similar: see ORDEAL: MAGIC.

Of the numerous books on witchcraft, we note the following: *Sadducismus Triumphatus*, *Sadducism Vanquished*, or, *Considerations about Witchcraft*, a work vindicating the belief in witchcraft, by Dr. Joseph Glanvil, chaplain-in-ordinary to Charles II., who was one of the first fellows of the Royal Soc., and wrote a meritorious treatise showing the value of skepticism in science. R. Baxter (q.v.), in his *Certainty of the World of Spirits*, upholds the same side. A successor of Glanvil, D. F. Hutchinson, chaplain to George I., in his *Historical Essay concerning Witchcraft* (1718), writes from the skeptical point of view. H. Williams's *Superstitions of Witchcraft* (1865) takes a wide historical view of the subject, and evinces extensive reading. C. Mackay gives a good digest of it in brief space in a section of his work on *Extraordinary Popular Delusions* (1841). Thomas Wright's *Narratives of Sorcery and Magic* (2 vols. 1852) contains a large collection of the most interesting stories of individual cases. Soldan, *Geschichte der Hexenprocesse* (Stutt. 1843); Ennemoser, *Geschichte der Magie*, 2d ed. (Leip. 1844; translated by W. Howitt, Lond. 1854). L. F. Alfred Maury, *La Magie et l'Astrologie dans l'Antiquité et au Moyen Age* (Lond. 1860), attempts to give a philosophy or theory of all superstitious beliefs. J. Grimm, *Deutsche Mythologie*, with his wonted sagacity and prodigality of learning, traces the several elements of the witch-creed to their roots in the beliefs of pagan times, Haas, *Die*



## WITCHES' SABBATH—WITENAGEMOT.

*Hexenprocesse* (1865); Roskoff, *Geschichte des Teufels* (1869); Buckle, *History of Civilization* (1857-61); Lecky, *History of Rationalism* (1865); Tylor's *Primitive Culture* (1871); Conway, *Demonology and Devil Lore* (1878).

WITCHES' SAB'BATH: see WITCHCRAFT: WAL-PURGIS-NIGHT.

WITCH-HAZEL, n. *wīch*- [AS. *wice*, a tree]: a N. American shrub, *Hamamelis virginica*, of the natural order *Hamamelidacæ*, which contains shrubs or small trees (none of them European) with alternate, stipulate, feather-veined leaves and small, axillary, unisexual flowers. The W. is often not more than 6 or 8 ft. in height, dividing at the base into several cylindrical grayish branches. Sometimes it attains a height of 20 or 30 ft. The leaves are about 4 in. long, and three broad, oval, with a few straight veins, wavy-toothed, and with the base unsymmetrical, one of the lobes answering to a very cordate form, the other slightly cordate. The flowers are clustered, yellow and showy, with long strap-shaped petals. They appear in late autumn, at the season when other trees and shrubs are parting with their leaves. The English name is derived from the supposed virtues of a forked twig as a divining-rod. the bark is commonly believed to have value as a sedative and discutient.

WITE, v. *wīt* [AS. *witan*, to censure]: in *OE.* and *Scot.*, to reproach: N. reproach; blame. WITING, imp. WITTED, pp. WITELESS, a. *wīt'lēs*, in *OE.*, blameless. Also spelled WYTE.

WITENAGEMOT, n. *wīt'ē-nā-gē-mōt'* [AS.—from *wita*, a wise man, and *gemot*, an assembly, a council]: among the *Anglo-Saxons*, the assembly of wise men; the supreme council or parliament of the nation, by which the king was guided in all his main acts of government. It was composed of the chief ecclesiastics, the ealdormen (see *ANGLO-SAXONS*) of shires, and some of the chief proprietors of land. It appears, though the matter is not free from doubt, that the lesser thanes, who formed part of the *scīr-gemōt*, or next inferior court, were not entitled to form part of the general council. In 934 there were present at one of these assemblies King Athelstane, 4 Welsh princes, 2 archbishops, 17 bishops, 4 abbots, 12 dukes, and 52 thanes.

The powers of the W. seem to have been very extensive. The king's title, however hereditarily unexceptionable, was not considered complete without its recognition, and it possessed the power of deposing him. It could make new laws and treaties; and with the king it appointed prelates, regulated military and ecclesiastical affairs, and levied taxes. Without its consent the king had no power to raise forces by sea or by land. It was also the supreme court of justice, civil and criminal. The W. was abolished by William the Conqueror, and its powers were only in part transmitted to parliament.—See Hallam's *Middle Ages*, c. 8; Sir F. Palgrave's *Rise and Progress of the English Commonwealth*; Kemble's *Saxons in England*,

## WITH—WITHER.

**WITH**, prep. *with* [AS. *with*; Icel. *við*; Dan. *ved*, against, opposite, by: Ger. *wider*, against]: against, noting opposition, antagonism, or competition, as, to *withstand* the devil (that is, *stand against* or 'resist' the devil), to fight *with* the invader; in the company of, as, I went *with* him; in the society of, as, we spent a pleasant evening *with* our friends; on the side of, as, he that is not *with* me is against me, to vote *with* the opposition; in the possession of, or in the care, keeping, or service of, as, to leave a message *with* one, he is book-keeper *with* the John Smith Co.; wearing, bearing, having, or characterized by, as, the man *with* the hat; in regard to or in respect of, as, to have no patience *with* one; by, noting agent (torn to pieces *with* a bear: Shak., *W. T.*, V. 2, 68), instrument (as, to write *with* a pen), material, or ingredient (as, a ship laden *with* tin-plates); in consequence of or on account of, as, to die *with* fright; from, indicating separation, etc., as, to differ *with* one, to part *with* one's last dollar; denoting connection, by denoting cause, instrument, or means.

**WITH**, pref. *with* [see above]: *with* as a prefix, except in the word *withal*, signifies opposition, privation, departure; from or against, as *withstand* (to stand against, resist); *withhold* (to hold back, retain); *withdraw* (draw away, retire); etc.

**WITH**, n. *with*: see **WITHE**.

**WITHAL**, ad. *with-awl'* [*with*, together, and *all*]: at the same time; likewise; moreover; as well.

**WITHDRAW**, v. *with-draw'* [*with*, denoting opposition, and *draw*]: to draw away; to take back or away; to call back or away; to retire; to cause to retire. **WITHDRAW'**-ING, imp. **WITHDRAWN'**, pp. *-drawn'*. **WITHDRAWAL**, n. *-draw'äl*, the act of taking back; a recalling; retirement. **WITHDRAW'ER**, n. *-er*, one who withdraws. **WITHDRAW'**-MENT, n. *-mënt*, the act of withdrawing. **WITHDRAW'ING**-ROOM, a room for retiring into—now called *drawing room*; the parlor or reception-room into which people withdraw after the repast in the dining-room is finished.—**SYN.** of 'withdraw': to recede; remove; retreat; secede; go back; retrograde.

**WITHE**, n. *with* or *with* [AS. *withig*; Icel. *vidir*; Dan. *vidie*; Ger. *weide*, an osier, a willow: Bav. *widen*, a band of twisted twigs: Lap. *wedde*, a tough twig for making baskets: comp. L. *viërë*, to twine; *vitis*, a vine]: a willow twig; a band consisting of tough flexible twigs, like those of the willow, twisted together; also spelled **WITH**. **WYTHE**. **WITHE**, a. *witht* or *withd*, bound with a withe or withes. **WITHY**, a. *with'i* or *with'i*, like a withe; flexible and tough: N. *with'i*, a large species of willow; a twig.

**WITHER**, v. *with'er* [the same word as *weather*—*lit.*, to expose to the action of the weather, to fade]: to fade; to lose native freshness; pine away; to make to fade; to become sapless; to shrink or cause to shrink; to blight. **WITH'ERING**, imp. **WITH'ERED**, pp. *-erd*: **ADJ.** become dry; faded. **WITH'EREDNESS**, n. *-nës*, the state of being faded or shrivelled up. **WITH'ERINGLY**, ad. *-li*.



## WITHER.

WITHER, *with'ér*, GEORGE: English poet and satirist: 1588, June 11—1667, May 2; b. Bentforth, Hampshire. He was educated at the grammar school of Colemore, and afterward at Magdalen College, Oxford, which he entered 1604. He remained there several years, and, after passing some time at home, went to London, and entered himself at Lincoln's Inn. His bent, however, was to literature rather than to law; and he shortly became known in certain circles as a writer of clever verses. In 1613, he published a volume of satire, *Abuses Stript and Whipt*, certain things in which, however, were considered offensive, and he was sent to the Marshalsea prison. During his imprisonment were composed his *Satire to the Kings* and his *Shepherds' Hunting*. In 1622 appeared a collection of his poems under the title *Mistress of Philarete*; and 1635 his *Emblems, Ancient and Modern*. Though he had very much identified himself with the party of the Puritans, among whom his writings were most popular, on the breaking out of civil disturbance he served as a capt. of cavalry in the ill-judged and abortive expedition of Charles I. against the Scotch Covenanters, 1639. When a little later, however, the general discontent determined itself into the grand struggle between the king and the English parliament, he promptly sided with the latter, and raised a troop of horse for its service by the sale of his estate. In the army of the parliament he attained the rank of major; but of his special services not much is known. On one occasion he was taken prisoner, and is said to have owed his life to a joke of Sir John Denham, the poet, who besought the royalists to spare his life, on the ground that, so long as W. lived, he (Denham) was not the worst poet in England. After the Restoration he was committed to the Tower and impeached as the reputed author of a pamphlet, *Vox Vulgi*, of a so-called seditious tendency, and for a time his life seemed in danger, but the impeachment was not proceeded with, and he obtained his liberty. He died in London.

W. was a voluminous writer: more than 100 separate publications of his have been noted by modern bibliographers (see Park's *British Bibliographer*, vols. I., II.), yet after his death his poetry fell into oblivion, or was regarded with such contempt that we find him introduced by Pope in the *Dunciad* as 'wretched Withers.' A later time has revised this decision; the grace, sweetness, fancy, and charm of natural simplicity which distinguished his verse have since been sufficiently recognized. The men to whom chiefly the resuscitation of his fame is owing are Southey, Lamb, and Sir Egerton Brydges. In his *Shepherds' Hunting*, in particular, are passages of such rare and finished beauty that no collection of the choicest things in English poetry is complete without them. His *Hymns and Songs of the Church* were edited, with introduction, by Farr 1856. The best and most complete account of W.'s life and writings is in Wilmott's *Lives of the Sacred Poets* (Lond. 1834).

## WITHERITE—WITHERSPOON.

**WITHERITE**, n. *wîth'ér-îť* [after Dr. *Withering*]: carbonate of baryta, a mineral of a whitish or yellowish-gray color, occurring massive of a somewhat fibrous structure, or in distinct crystals—employed extensively in chemical works, in the manufacture of plate-glass, porcelain, etc., and used in France in the manufacture of beet-root sugar; also called **BAROLITE**.

**WITHERS**, n. plu. *wîth'êrz* [AS. *withēr*, against: Ger. *widerrist*—from *wider*, against, and *rist*, an instep, an elevation]: the ridge between the shoulder-bones of a horse at the bottom of the neck and mane. **WITH'ER-BAND**, the piece of iron which unites and strengthens the bow of a saddle, over the withers. **WITH'ER-WRUNG**, a. injured in the withers. **WITHERS UNWRUNG**, uninjured on the withers; safe and sound.

**WITHERS**, *wîth'êrz*, **FREDERICK CLARKE**: architect: b. Shepton-Mallet, Somersetshire, England, 1828, Feb. 4. After a classical education and the study of architecture he came to the United States and became distinguished for his designs of churches and other buildings. Besides elegant churches at Newburgh and Matteawan, N. Y., Summit, N. J., Hanover, N. H., Louisville, Ky., and Altoona, Penn., and many other places, he has executed the State Hospital for the Insane at Poughkeepsie, N. Y., the buildings for the Columbia Institution for Deaf and Dumb at Washington, D. C., and the Jefferson Market court-house and prison in New York. The elaborate and costly altar and reredos in the chancel of Trinity Church, New York, erected as a memorial of William B. Astor, was designed by him and executed under his direction.

**WITHERSHINS**, ad. *wîth'êr-shînz*, or **WIDDERSHINS** [from *withēr*, against (see **WITH**), and *shins*, a corruption of *sun*]: literally, against the sun; in a direction contrary to the apparent motion of the sun; in the opposite direction; hence, in the wrong way.

**WITHERSPOON**, *wîth'êr-spôn*, **JOHN**, D.D.: clergyman, educator, and signer of the Declaration: 1722, Feb. 5—1794, Sep. 15; b. Gifford, Haddingtonshire, Scotland; descendant on his mother's side from John Knox. He was graduated at Edinburgh 1742; was ordained minister at Beith 1745; became noted for his ecclesiastical and doctrinal writings; was installed pastor at Paisley 1757, Jan. 16; and, after once declining 1766, accepted the presidency of the College of N. J. at Princeton, and filled the office with great success from 1768, Aug. 17, to his death. As an educator, besides teaching divinity, he introduced in America the metaphysics of Reid, promoted the study of mathematics, of political science, and of international law, of Hebrew and of French, and made many improvements in educational methods. In the revolution he was a foremost leader, early described as being 'as high a son of liberty as any man in America.' He preached vigorously, 1776, May 17, in support of the patriot congress; was elected a member of the provincial congress of N. J. and



## WITHHOLD—WITNESS.

opened its deliberations with prayer 1776, June 11; was elected, June 22, one of five representatives of N. J. in the continental congress at Philadelphia; followed Adams (*pro*) and Dickinson (*con*) in the great debate of July 1, strenuously insisting on immediate declaration of independence; continued to 1783, except a short absence 1779-80, one of the leaders of congress, and was the initiator of many important measures and author of numerous state papers. His publications from 1753 were gathered into his *Works* (4 vols. 1801). His statue was set up at Philadelphia 1876, Oct. 20.

**WITHHOLD**, v. *with-hôld'* [*with*, against, and *hold*]: to restrain; to keep from action; to keep back; to refuse to grant, give up, or the like. **WITHHOLD'ING**, imp. **WITHHELD'**, pt. pp. *-hêld'*. **WITHHOLD'EN**, old pp. of *withhold*, *-hôld'n*. **WITHHOLDER**, n. *-êr*, one who withholds. **WITHHOLD'MENT**, n. *-mênt*, the act of keeping back or refusing.

**WITHIN**, prep. *with-in'* [*with*, and *in*]: *in*, as opposed to *out*; in the limits or compass of; not beyond; in the inner parts of; indoors; not longer ago than; not further away than; not exceeding: **AD.** inwardly; internally; indoors.

**WITHOUT**, prep. *with-owt'* [*with*, and *out*]: not within; on the outside of; beyond; in a state of destitution or absence from; independent of; not in possession of: **AD.** not on the inside; out-of-doors; externally: **CONJ.** in *OE.*, unless; except. **WITHOUT'EN**, prep. *-owt'n*, *OE.* for **WITHOUT**. **WITHOUT SIDE**, ad. *-sîd*, in *OE.*, outside.

**WITHSTAND**, v. *with-stând'* [*with*, against, and *stand*]: to oppose; to resist. **WITHSTAND'ING**, imp. **WITHSTAND'ER**, n. *-êr*, one who or that which resists. **WITHSTOOD'**, pt. pp. *-stûd'*.

**WITH'Y**, a. n.: see **WITHE**.

**WIT'LESS**, **WIT'LESSLY**, etc.: see **WIT**.

**WITNESS**, n. *wit'nēs* [*AS.* *witnes*, testimony—from *witan*, to perceive, to know: *OHG.* *gewiznesse*, experience, testimony: *Icel.* *vitneskja*, intelligence, notice; *vitna*, to testify]: testimony; knowledge or matter adduced in proof; a person who is personally present and sees some occurrence or hears some remark or the like, and is therefore qualified to give evidence regarding it; one who gives evidence; one who sees the execution of a will, a deed, or the like, and subscribes his name to it to confirm its authenticity: **V.** to see or know by personal presenee; to attest; to testify; to give testimony to; to give evidence: to see the execution of a deed and subscribe it: **IMPERA.** see, in evidence or proof—as, *witness my hand*. **WIT'NESSER**, n. *-êr*, one who gives testimony. **WIT'NESSING**, imp. **WIT'NESSED**, pp. *-nêst*. **WITH A WITNESS**, in *OE.*, effectually; to so great a degree as to leave a lasting mark.

## WITNESS.

**WITNESS:** a person in whose presence or under whose observation something has taken place, and who is therefore able to testify to what he knows of the matter at first hand; or one who testifies under oath, or who has been summoned or is capable of being summoned to give evidence by a court of law, or by some officer or body authorized to take evidence. A person who is called on to be present at some transaction, such as the making of a will, and who signs his name to some written instrument, is called an *attesting witness*. All persons of whatever nation are liable to be witnesses, and it is a duty which every citizen owes to his fellow-citizens to be available whenever his testimony is deemed desirable. The following persons however are incompetent: (1) Infants or persons so young as to be unable to appreciate the nature and binding quality of an oath; (2) atheists and such as are insensible to the obligation of an oath from defect of religious sentiment or belief; (3) idiots, lunatics, and intoxicated persons; and (4) infamous persons—i.e., persons convicted of treason, felony, *crimen falsi*, etc.: also, in general, husband and wife cannot be compelled to testify for or against each other. The usual mode both in England and in the United States of summoning a witness in a court of law is by serving him with a *Subpœna* (q.v.), reciting that a certain action is pending in a court named, and a trial is to take place, and commanding the witness to lay aside all and singular business and excuses, and appear at the time and place before the court mentioned, under a penalty (*sub pœnâ*). This is more fully called a *subpœna ad testificandum*. The corresponding term in Scotch law is *Diligence* (q.v.). If the witness is required to produce a document or documents in his possession, it is called a *subpœna duces tecum*, and he is told in the writ to bring the document. In general, all competent persons may be compelled to attend and testify, except, perhaps, experts who are to testify to their 'opinion' and not to fact. If a witness do not attend at the time and place mentioned, he is liable to be punished, either by attachment—i.e., summary imprisonment for contempt—or by an action for damages at the suit of the party summoning him. The *subpœna*, or notice to attend, must be served a reasonable time before the witness is wanted, and it is generally necessary to give a day's notice beforehand. During a witness's attendance on this public duty, he is privileged from arrest: thus, he cannot be taken into custody for debt while he is going to, remaining at, or returning from the court; and if a non-resident from another state be in attendance on a trial in a circuit court of the United States, he must be allowed a reasonable time after the disposition of the cause to enable him to return to his own state. Moreover, a witness is entitled, before he go to the court, to have his reasonable travelling expenses paid to him, and a sum for subsistence while he remains in attendance. He is also entitled to a reasonable allowance for his lost time while attending a civil trial. A witness may, in a civil case, but not in a criminal case, refuse to give evidence until his



expenses are paid or a tender made. A witness, before examination, is required to take an oath, which may be in any form which he considers most binding on his conscience. The testimony of witnesses is taken in three ways: by Affidavit (q.v.); by Deposition (q.v.); and by oral examination. When a witness is examined, he is generally asked specific questions, first, by the party calling him, and during this examination in chief the rule is that he is not to be asked leading questions—i.e., questions which suggest the answer desired. The opposite party is then allowed to cross-examine the witness, and in doing so may ask leading questions, or test in every way the truth of the witness's statement. After this the witness may be re-examined. There is a technical rule that the party calling a witness is not allowed to impeach his credit, or ask anything having that effect. There are certain questions which a witness may refuse to answer. Such are questions the answer to which might render the witness liable to a criminal charge or penalty; but he cannot refuse if the effect would merely be to render him liable to a civil action, or merely to degrade him. If a witness live in a foreign country, or out of the state, or at a distance from the court, or if he is sick, or aged, or about to leave the state, or in cases where it would be impossible or very inconvenient for him to attend in person, the court may issue a commission to some person to take his deposition. In criminal cases, however, such depositions cannot be used without the consent of the defendant, in accordance with the constitution of the United States, that in all criminal prosecutions the accused shall enjoy the right to be confronted with the witnesses against him. Usually, when a witness is sworn, a New Testament is put in his hand, and after the officer of court repeats the form, the witness kisses the book. The form of words commonly is, 'You do swear that the evidence you shall give to the court and jury, touching the matter in question, shall be the truth, the whole truth, and nothing but the truth, so help you God.' When the witness is a Jew or foreigner, the form varies. In New England and New York the gospels are not generally used; the witness, when sworn, holding up his right hand, repeats the words above quoted, or, as in Scotland: 'I swear by Almighty God, as I shall answer to God at the great day of judgment, that I shall tell the truth, the whole truth, and nothing but the truth, in so far as I know or shall be asked.' A form that has been used in some notable cases is: 'I swear by the Living God to tell now and here the truth,' etc.

WITNEY, *wit'nī*: manufacturing and market town of Oxfordshire, England; 10 m. w.n.w. of Oxford. There is a spacious cruciform church, a blanket-hall (built 1721), a town-hall, and cross (1683). It manufactures blankets, noted for peculiar whiteness, due, it is said, to the sulphurous qualities of the waters of the Windrush.—Pop. (1881) 8,017; (1891) 3,110.

WITSNAPPER, *n.* *wit'snăp-pér* [*wit*, and *snăp*]: in *OE.*, one who attempts repartee, but with indifferent success.

WITT: see *DE WITT*.

WITTEKIND, *wit'teh-kind*: Westphalian chieftain, leader of the Saxons against Charles the Great: 8th c. He appears in history first in 774, as a leader in expeditions of the Saxons against the fortress of Eresberg, in Westphalia, and the Frankish province of Hesse, while Charles was subduing the Lombards. When most of the Saxon nobles submitted to Emperor Charles at the imperial diet at Paderborn 777, W. fled to Siegfried, King of Jutland, whose sister Geva he is said to have married. In 778 he returned, and when Charles was absent in Spain began to lay waste the Rhine country. Charles's return forced him again to take refuge in Jutland; but 782 he fell upon the Frankish army by surprise at the Sintelberg, and annihilated it—an act which Charles avenged by the execution of 4,500 Saxons. On this, all the Saxon tribes rose in arms, and the war was again led by W. until 785, when Charles entered into negotiations with him, the result of which was that W. repaired to the emperor's camp at Attigny, in Champagne, and received baptism. After that he appears no more in history. According to the legend current in Westphalia, Charles promoted W. to be Duke of the Saxons, and made over Engers to him. From his castle called Babilonie, in the neighborhood of Lübeck, he is said to have ruled with gentleness and justice till 807, when he met his death in a campaign against Duke Gerold of Swabia. His bones repose in the parish church of Engers, in the duchy of Ravensberg, where Charles IV. erected a monument to him 1377. Another monument in his honor was erected at Minden by the Westphalian Soc. 1812, Oct. 18. The higher of the two hills which form the Westphalian gates on the Weser, near Minden, bears the name of Wittekindsberg.

WITTENBERG, *wit'tén-běrch*: town of Prussian Saxony; on the Elbe; 55 m. s.w. of Berlin. Till 1873 it was a fortress of the third rank. It is interesting as having been capital of the electorate of Upper Saxony, as the cradle of the Reformation, and as containing the remains of the Reformers Luther and Melanchthon. The famous university (founded 1502), in which Luther was professor, and mentioned by Shakespeare as the school where Hamlet studied, was incorporated with that of Halle, and removed, 1815, Apr. 12. In the *Stadt-Kirche* are two pictures, in one of which Melanchthon is represented as administering baptism, and Luther as preaching to a congregation, of which the two foremost figures are his wife and son. In the *Schloss-Kirche* are the tombs of Luther and Melanchthon, as well as those of Frederick the Wise (with a bronze statue by Vischer) and John, electors of Saxony. On the doors of this church—which were burned by the French, but replaced by others of metal—Luther nailed his 95 theses against the papal doctrine of indulgences. The house of the great Reformer, containing his chair, table, etc., and two portraits of him by Cranach, his friend and



## WITTENBERG COLLEGE—WIZEN.

contemporary, remains almost unaltered. The houses of Melancthon and Cranach also are shown. In the market-place is a bronze statue of Luther by Schadow, not far from which is also one of Melancthon; and outside the Elster Gate a spot is pointed out as the place where in 1520 Luther burned the papal bull. Manufactures of woolen and linen goods, hosiery, and leather are carried on. Brandy is distilled, and beer brewed.—Pop. (1890) 14,458.

**WITTENBERG COLLEGE:** at Springfield, O.; under the auspices of the Luth. Church; chartered and opened as a college 1845. The grounds comprise 40 acres at the highest point of the city. In 1874 the college was made co-educational, and one of the finest of its new buildings, Ferncliff Hall, is the woman's dormitory. The value of grounds and buildings, 1894-5, was \$350,000; vols. in library 12,000; value of scientific apparatus and library \$15,000; amount of productive funds \$195,000; total income \$21,000; benefactions for the year \$45,000; number of profs. and instructors 17; students 380. Samuel Alfred Ort, D.D., LL.D., president.

**WITTICISM, WITTINESS, WITTY, WITTINGLY,** etc.: see **WIT**.

**WITTOL**, n. *wit'tōl* [a corruption of *witwall*, one of the birds into the nests of which the cuckoo drops its eggs]: in *OE.*, a cuckold; one who winks at his wife's infidelity. **WIT'TOLLY**, ad. *-tōl-lī*, in *OE.*, in a cuckold manner.

**WITWAL**, or **WITWALL**, n. *wit'warl* [see **WOODWALE**, of which *witwal* is merely a form: Ger. *witterwal*, a yellow thrush]: a bird of a yellow or greenish-yellow color; the popinjay or green woodpecker; also called **WODEWALE**.

**WIV'ERN:** see **WYVERN**.

**WIVES**, n. *wīvz*: plu. of **WIFE** (q.v.). **WIVE**, v. *wīv*, to provide with a wife; to marry. **WIV'ING**, imp. **WIVED**, pp. *wīvd*. **WIVE'HOOD**, n. *OE.* for **WIFEHOOD**.

**WIZARD**, or rarely **WISARD**, n. *wiz'erd* [from *wise*, signifying, in the language of the vulgar, 'the cunning man,' 'a conjurer']: an adept in the black-art; a magician; a sorcerer; a conjurer; in *OE.*, a wise or learned person: **ADJ.** enchanting; charming; enchanted. **WIZ'ARDRY**, n. *-erd-rī*, the practices of a wizard; magic.

**WIZEN**, a. *wīz'n* [Icel. *visinn*; Dan. and Sw. *vissen*, dried up, withered: AS. *wisnian*, to become dry]: shrivelled; dried up: V. in *Scot.*, to wither; to dry up. **WIZENING**, imp. *wīz'n-ing*. **WIZENED**, pp. *wīz'nd*: **ADJ.** dried up; shrivelled. **WIZ'EN-FACED**, a. having a shrivelled thin face.

## WO—WODEN.

WO, or WOH, int. *wō*: an exclamation or cry to horses to make them stop: N. stop; check.

WOAD, n. *wōd* [AS. *waad*; Dut. *weede*; Ger. *waid*; F. *guède*, woad]: a plant of the genus *Isatis*, formerly extensively cultivated in Great Britain, for the blue dye extracted from its leaves, now superseded by indigo; the color extracted from it. WOAD'ED, a. colored or stained with woad.—*Woad* belongs to the natural order *Cruciferae*, which contains only a few species, mostly natives of countries around the Mediterranean. DYER'S W. (*I. tinctoria*) was formerly much cultivated in Great Britain for a blue dye obtained from its root-leaves. The use of this dye has nearly ceased, in consequence of the more general introduction and diminished cost of indigo. Dyer's W. is a biennial plant, with oblong crenate root-leaves about 12 in. long on long stalks; upright, much-branched leafy stem about 3 ft. high; small yellow flowers, and large seed-vessels, about half an inch long and 2 in. wide, hanging from slender stalks. The leaves when cut are reduced to a paste, which is kept in heaps for about 15 days to ferment, and then formed into balls which are dried in the sun, and which have a rather agreeable smell and are of violet color within. These balls are subjected to a further fermentation before use by the dyer. When W. is now used, it is always as a ferment in vats with indigo, which improves the color. Even by itself, however, it yields a good and very permanent blue. It is supposed that W. was the dye used by the Picts for painting their persons.

WOBURN, *wō'bérn*, local pron. *wó'bérn*: town in Middlesex co., Mass.; on the Boston and Maine railroad; 10 m. n.n.w. of Boston. It contains the villages of North Woburn and East Woburn, connected by a street railroad, and has a bountiful supply of pure water from a reservoir on Horn Pond Mountain. W. is a town of much business thrift. It was founded 1640, and has been noted for its manufactures of leather since 1673. The industry now has 35 establishments, which employ a capital of nearly \$4,000,000 and more than 2,000 hands, pay more than \$700,000 for wages and \$4,000,000 for materials, and yield products valued at \$6,000,000. Other manufactures are boot and shoe stock, glue, chemicals, electrical apparatus, steam-engines, machinery, foundry products, and pianos. W. had a number of churches, high school, Warren acad., graded schools, 2 public libraries (which had together [1900] 44,945 vols., \$8,042 income), 1 nat. bank (cap. \$200,000), 1 savings bank, and a number of weekly periodicals.—Pop. (1890) 13,499; (1900) 14,254.

WODEN, *wō'den*: an Anglo-Saxon deity, from whom *Wednesday*, the fourth day of the week, derives its name; see ODIN, which is the Norse form of the same name.



## WODROW—WOE.

**WODROW**, *wúd'rō*, **ROBERT**: Scottish Presb. minister and church historian: 1679–1734, Mar. 21; b. Glasgow; second son of James W., prof. of divinity in the Univ. of Glasgow. He was educated at the Univ. of Glasgow, and studied theology under his father. In 1703 he was licensed to preach, and was appointed minister of Eastwood, in Renfrewshire. In that parish he labored faithfully till his death, declining offers to more important pastoral charges. Soon after his settlement at Eastwood, he began a history of the Church of Scotland from the Restoration to the Revolution. He spared no pains and freely used his limited means in collecting materials for this work. He corresponded with all persons who could give him information, and transcribed with his own hand the civil and ecclesiastical records bearing on his subject. The work (2 vols. folio 1721–25) was dedicated to King George I.; and in 1725 he received an order on the Scottish exchequer for £105, as a mark of the royal bounty—probably his chief pecuniary recompense. A second ed. of the history, 4 vols. 8vo, appeared at Glasgow 1828. *The Lives of the Scottish Reformers and most eminent Ministers* 2 vols., and *Analecta; or, a History of Remarkable Providences* 4 vols. have been printed by the Maitland Club. W.'s correspondence (3 vols.) has been pub. by the Wodrow Society. His great work—the history—is what it professes to be, a 'History of the Sufferings' of the Presb. Church, rather than an ecclesiastical history of the period. In this limited range it is of value to the student of Scottish history, as a storehouse of materials; but, in view of W.'s credulity and the fact that he could rarely admit a fault in those of his own side, there may well be question as to the credit to be given to his narration of facts. The fullest memoir of W. is that prefixed by Dr. Burns to his ed. of the history 1828.

**WOE**, int. *wō* [imitative of the deep-drawn breath of severe pain: Gr. *ouai*; L. *vae*; W. *gwae*; Dan. *vee*; Icel. *vei*; Ger. *weh*; AS. *wá*, woe]: alas! an exclamation of pain or grief: N. grief; misery; a heavy calamity; distress; a curse; a denunciation of calamity. **WOE'FUL**, or **WO'FUL**, a. *-fûl*, distressed with grief or calamity; bringing distress or affliction; calamitous; wretched; miserable; paltry. **WOE'FULLY**, or **WO'FULLY**, ad. *-lŭ*. **WOE'FULNESS**, or **WO'FULNESS**, n. *-nēs*, the state or quality of being woeful; misery; calamity. **WOE'-BEGONE**, a. lost in woe; very sad; overwhelmed with grief or sorrow.

## WOJWODA—WOLCOT.

**WOJWODA**, *woy-wō'da* (Polish, *Wojewoda*); also **WAI-VODE**, *wā'vōd*, **WAIWODE**, *wā'wōd*, **VAIVODE**, *vā'vōd*, **VOIVODE**, *voy'vōd*: old Slavonic word [composed of *woi*, warrior, and *wodit*, to lead]: literally, army-leader or general; title of the elective princes of the Slavonic peoples before hereditary monarchies were formed, as in Walachia and Moldavia. From the Greek emperors, with whom these princes had been in intimate alliance from 1439, the princes next received the title Despot, afterward exchanged for that of Hospodar. The name W. was given also to the elective princes of Transylvania, dependent or independent, and was applied to the elective chiefs of the Polish govt. before the beginning of the Piast dynasty. Later the name denoted office and dignity, and was given, in the former kingdom of Poland, to the governors of the districts into which the kingdom was divided. They had at first only a military authority; afterward both the civil and military were united in one person, so that W. and 'Palatine' were one and the same. The name of Wojwodschaft (Vaivodeship) was preserved in Russian Poland till recent times; now the Polish Wojwodschafts are named uniformly with the other Russian 'governments.' From 1849 till 1860 the Banat (q.v.) and part of the military frontier constituted a separate Austrian crown-land, called 'the Servian Woivodina and Temeser Banat.'

**WOKINGHAM**, *wōk'ing-am*, or **OAK'INGHAM**: small market-town of Berkshire, England; 7 m. s.e. of Reading, with which it is connected by rail. Its manufactures are shoes, and gauze and silks. In the original *Rose Inn*, Gay, Swift, Pope, and Arbuthnot, being detained here by wet weather, composed among them the old song *Molly Mog*. The parish church was rebuilt 1864; the town-hall, with covered market, dates from 1860. W. is the only town in Windsor Forest.—Pop. (1881) 3,100; (1891) 2,060.

**WOLCHOW**, or **VOLKHOV**, *vōl-čov'*: see **ILMEN: LA-DOGA, LAKE**.

**WOLCOT**, *wūl'kot*, **JOHN**, M.D. (better known under the pseudonym *Peter Pindar*): English painter and satirist: 1738–1819, Jan. 14; b. Dodbrooke, Devonshire. He was educated at the charge of his uncle, a surgeon and apothecary of Fowey, Cornwall. After studying medicine at the London hospitals, he accompanied Sir William Trelawny to Jamaica as medical attendant 1769; but finding his professional income too small for his wants, he solicited and obtained a church-living in the island. His congregation consisted mostly of negroes, and, Sunday being their principal holiday and market-day, the attendance at church was very limited. Sometimes not a single person came; and W. and his clerk—the latter being an excellent shot—used at such times, after waiting for ten minutes, to proceed to the seaside, to enjoy the sport of shooting ring-tailed pigeons. The death of Trelawny, 1772, induced W. to abandon both Jamaica and the priesthood. Returning to England, he tried to establish himself as a physician at Truro, in Cornwall, but does not appear to have succeed-



ed In 1779 he left Truro, and two years later removed to London, where he engaged in writing audacious squibs and satires in verse, on all sorts of persons, from King George III. down to the Liverymen of London, and lower. W. is an exceedingly clever writer. Unscrupulous, impudent, and coarse, he is yet a master of burlesque humor and comic caricature: his verse is easy, vigorous, and idiomatic; and his fancy rich in ludicrous metaphor. Two of his raciest pieces were levelled at George III., 'the farmer king'—*The Apple-dumplings and a King*, and *Whitbread's Brewery Visited by their Majesties*, in the former of which the king is represented as wondering how the apples got into the apple-dumpling. Besides these may be mentioned *Lyrical Odes* on the Royal Acad. Exhibition (earliest of his London efforts, 1782); *Bozzy and Piozzi, or the British Biographers*; *Peeps at St. James's*; *Epistle to a Fallen Minister*; *Odes to Mr. Paine*; and the *Lousiad, a Heroi-comic Poem*, in five cantos; etc. *Six Picturesque Views from Paintings by Peter Pindar, engraved by Alken*, appeared 1797. Some of W.'s serious effusions possess considerable merit. If the matter, or rather the themes of his verse, had been less worthless, it would have had better chance of permanent popularity. In his own lifetime his productions were eagerly read, and he had an annuity from the booksellers of £250 for the copyright of them. He was considered so formidable a personage that the ministry are said to have endeavored to bribe him into silence. W., who records this proof of his power, also asserts the incorruptibility of his patriotism. He died at Somers Town, London, and was buried at St. Paul's, Covent-Garden.

WOLCOTT, EDWARD OLIVER, LL.B.; 1848, Mar. 26—  
 ———; b. Longmeadow, Mass.: politician. He served as a private soldier (1864) in the 150th regt. Ohio vols. He afterward entered the class of 1870 at Yale, but did not graduate, though he received later the degree A.M. In 1871 he graduated at Harvard law school. Removing to Colo., he there entered on the practice of law. Eventually he became interested in silver mining. In 1888 he was elected by the republicans to the U. S. senate, and re-elected 1894. Though favoring, as a bimetallist, the free coinage of silver, he supported McKinley in the campaign of 1896, against the free-silver republicans. In 1897 he was a member of a commission which visited Europe in the interest of bimetallism.

WOLCOTT, OLIVER: successor of Alexander Hamilton as sec. of the treasury: 1760, Jan. 11—1833, June 1; b. Litchfield, Conn.; son of Gov. Oliver W. While student at Yale, he served in the Conn. militia; after graduation 1778 he studied law in intervals of active military service; began practice in Hartford 1781; was financial clerk of the state and mem. of pay committee 1782; commissioner on state claims against the general govt. 1784; comptroller 1788; auditor of the U. S. treasury 1789, and its comptroller 1791, succeeding Hamilton as sec. of the treasury 1795, and resigning indignantly 1800, because a congressional committee did not exonerate him from base insinu-

## WOLCOTT-WOLD.

ations in regard to the burning of the treasury building. Pres. Adams and the senate at once made him circuit judge, but the office was annulled by an act in 1802; after which W. was a merchant in New York, and first pres. of the Bank of North America 1812-14. Later he became gov. of Conn., serving 1818-27, and presided at the constitutional convention. He died in New York, where his last years were spent.

WOL'COTT, OLIVER, LL.D.: signer of the Declaration of Independence: 1726, Nov. 26—1797, Dec. 1; b. Windsor, Conn.; son of Gov. Roger W. He graduated at Yale 1747; served as capt. on the n. frontier in the French war; studied medicine; was sheriff of Litchfield co. 1751; mem. of the colonial council 1774-86; judge of the county court and of probate; commissioner of Indian affairs 1775; and was efficient in harmonizing the territorial disputes between Conn. and Penn. and between N. Y. and Vt. The leaden statue of George III., on Bowling Green, New York, which the citizens overturned 1776, was removed to Gen. W.'s residence in Litchfield, Conn., where his daughters and their friends converted its material into cartridges for the militia. In 1776 W. was mem. of congress, and, after the Declaration, as maj.gen. he organized 14 regts. of Conn. militia, and continued this work in 1777, largely reinforcing Gen. Putnam on the Hudson, and commanding a brigade in the operations against Burgoyne. He attended congress at intervals to the end of his term 1778. The next year he defended the Conn. coast. He was again in congress 1780-84; as commissioner had part in the treaty with the Six Nations 1785; was lieut.gov. of Conn. 1786-96; and gov. until his death, which occurred in Litchfield.

WOL'COTT, ROGER: colonial governor of Conn.: 1679, Jan. 4—1767, May 17; b. Windsor, Conn. Apprenticed to the trade of weaver, he followed that business with success. He was a mem. of the colonial assembly 1709; commissary in the expedition to Canada 1711; mem. of the council 1714; county-court judge 1721; supreme-court judge 1732; and chief judge 1741, and deputy gov. As maj.gen. he led the Conn. forces in the Louisburg expedition 1745, and was gov. of the colony 1750-54. He published *Poetical Meditations* (1725), including a description in verse of the visit of Gov. John Winthrop to Charles II. 1661; also, *The New England Congl. Churches are and always have been Consociated Churches* (1761).—His son ERASTUS W., 1722-93, mem. and speaker of the Conn. assembly, held several judicial offices; was col. under Washington at Boston; brig.gen. 1777; engaged in several milit. expeditions; and subsequently was judge of the supreme court of Conn.

WOLD, n. *wöld* [Icel. *völkr*, a field. plain: O. Dan. *vold*, a field: Ger. *wald*, a wood]: a down hilly and void of wood, a plain or open country; same as WEALD (q.v.).

WOLD, n. *wöld*: a plant: see WELD 2,



## WOLF.

WOLF, n. *wúlf* [Goth. *vulfs*; Icel. *ulfr*; Dan. *ulv*; Lith. *vilkas*, a wolf: allied to L. *lupus*; Gr. *lukos*, a wolf]: a fierce beast of prey of the dog kind; a term applied to any person who is ravenous and destructive; a small white worm infesting granaries; a tubercular disease, otherwise called *Lupus* (q.v.): plu. WOLVES, *wúlvs*. WOLF-DOG, large kind of dog used for hunting the wolf, formerly abundant in Norway and Sweden, but now found almost exclusively in Spain, into which it is supposed to have been introduced by the Goths. It belongs to the same group as the Shepherd's Dog, and is of large size, little inferior to the mastiff, with pointed nose, erect ears, long silky hair, and a very bushy tail, curled over the back. In color it is mostly white, with large clouds of tawny color or brown. WOLFISH, a. *wúlf'ish*, having the qualities or form of a wolf; rapacious; savage; ferocious. WOLF'ISHLY, ad. *-lī*. WOLF'ISHNESS, n. *-nēs*, the state of being wolfish. WOLF-FISH, a ferocious fish (see SEA-WOLF, under SEA) To KEEP THE WOLF FROM THE DOOR, to keep away poverty. To CRY 'WOLF,' to give a false alarm.—The *Wolf* is a carnivorous quadruped belonging to the genus *Canis*, the same as that to which the dog belongs. It is doubtful if the different kinds of wolves found in different parts of the world, are to be regarded as species or varieties, though they have, provisionally, received specific names. There exists among them the same close resemblance as in the different kinds of dog, with similarly marked distinction of characters, which, however, it is difficult to state as specific characters are generally stated. Wolves, in their most important characters, and those generally regarded as best marking specific distinction, agree not only with each other, but with dogs. The opinion that the W. is the parent of the dog, or of some kinds of dog, is favored by the identity of the period of gestation, an important point which seems established. Dogs and wolves also intermix, but it is not yet fully ascertained that the offspring continue fertile among themselves. It is further observed that wild races of dogs, whether originally wild or having become wild (*feral* races), resemble wolves in many respects—in their dull uniformity of color, in their lengthened muzzle, lengthened limbs, lank form, and gaunt aspect, and even in the bushiness of the tail. It has been alleged, as a reason against supposing the W. and the dog to be of the same species, that the W. is incapable of domestication and of attachment to man; but this is not the fact. Both the Common W. of the old world and the wolves of America have been found capable of domestication when taken young, and instances are on record of their having shown, like dogs, attachment to their master.

The COMMON W. (*Canis lupus*) inhabits Europe and n. Asia, its range extending from the Arctic regions as far s. as n. Africa and n. India. It is of yellowish or tawny-gray color; with strong coarse hair, longest on the ears, neck, shoulders, and haunches, but particularly on the throat; muzzle black, upper lip and chin white. The ears are erect and pointed; muzzle sharp; legs rather longer

## WOLF.

than those of the Shepherd's Dog; tail bushy, but not curling; eyes oblique, giving a peculiar vicious expression to the countenance. The W. is swift of foot, and hunts deer and other animals, packs of wolves associating for this purpose; it also often commits great ravages among sheep; and attacks calves, but seldom full-grown oxen. It seldom attacks man, unless hard pressed by hunger. The hungry wolves which sometimes descend, in severe winters, from the forests of the Alps, Pyrenees, and other mountains, are much dreaded by the inhabitants of neighboring regions; and terrible stories are told of travellers chased by packs of wolves in the forest-covered plains of e. Europe, and in Spain. In general, the W. is stealthy and cowardly, approaching sheepfolds and farm-buildings by night,



Common Wolf (*Canis lupus*).

in search of prey, but easily scared by any demonstration of watchfulness. It defends itself, however, with great vigor, when compelled to do so. It is not easily trapped, being extremely cautious, apparently understanding the nature and purpose of a trap almost as well as those by whom the trap is set.

Diversities appear in wolves of different countries of Europe and Asia. French wolves are generally browner and rather smaller than those of Germany; the wolves of Russia are larger, and have longer hair; the wolves of the Alps are brownish gray and not large; in Italy and Turkey a tawny color predominates. In some far northern regions, wolves become white in winter; and white wolves, probably albinos, sometimes occur in more s. regions. The Black W. is the most marked European variety: it is found in the Pyrenees and in Spain, and is very large and strong. Strings of mules are often followed by these wolves in the passes of the Pyrenees after evening comes on, and they frequently succeed in capturing some of the animals.

Wolves are still very plentiful in some parts of Europe. In the Pyrenees and Ardennes, among the Carpathian Mountains, in Turkey and the Principalities, they are



common; and in the vast forests of Poland and Russia wolves often appear in formidable packs, and still cause much loss by their attacks on cattle, sheep, and horses. As cultivation increases, wolves become scarce. The W. was formerly common in Great Britain, and the Anglo-Saxon name for January, *Wolf-month*, is significant of this fact. Places of refuge from wolves were erected for travellers in wild and unpeopled districts. King Edgar commuted the punishment of criminals on their producing a certain number of wolves' tongues. Lands in Derbyshire were held on condition of killing wolves. It is not easy to say at what date wolves ceased to exist in England; it was probably about the end of the 15th c.; but they continued to commit serious ravages on flocks, in Scotland, in the end of the 16th c., and the last W. in Scotland is said to have been killed 1743. In Ireland the last was seen 1770. See Hastings's *British Animals* (1881).

The American wolves are very similar to those of the old world, and are of the same species, though they have been described as forming several distinct species. The fur is thicker and the form more robust than in the Common W., muzzle less pointed, profile not so straight, legs and ears shorter, and tail more bushy. The GRAY W. (variety *occidentalis*), becoming whitish northward, is abundant in northern parts of N. America, except in the long-settled districts, from which it has been expelled by man. It is the only kind found in Canada. A few are said still to remain in uninhabited mountainous and wooded parts of New England. Packs of wolves formerly followed the herds of buffaloes (bisons) on the western prairies, not daring to attack strong animals, but ready to seize any sickly straggler that fell behind the rest. They hunt and run down deer. The Gray W. equals the European species in cunning, and has been known to bite off the cord close to the trigger of a set gun, and afterward to devour in safety the bait placed before the muzzle. It has also been known to haul up fishing-lines set in a hole of the ice, and to help itself to the fish. It is frequently taken by means of pit-falls. On the prairies the Indians were in the habit of killing great numbers of wolves by inclosing them in a circle gradually reduced, but originally extending over many miles. In some parts of the United States a premium of \$10 to \$20 a head was formerly paid for the destruction of wolves, partly by the state, and partly by the county or town, because of their ravages among sheep. The range of the Gray W. extends to the coldest n. regions, as Melville Island and Banks's Land. On the western plains the Gray W. gives place to the DUSKY W. (variety *nubilus*); in Fla. is the BLACK W. (variety *ater*); and the RUFOUS W. (variety *rufus*) in Texas. They differ little in characters and habits from the Gray Wolf.—The PRAIRIE W. (*C. latrans*), or COYOTE, is a very different animal, more resembling the jackal. It is found from Mexico n. to the Saskatchewan, abounding on the vast plains of the Missouri. It is 55 in. long, tail 11 in.; muzzle sharp and fox-like; ears very large and erect; four toes on each

## WOLF.

foot, and on the forefeet a sharp claw on the inside, 2 in. above the ground, attached to the rudimentary thumb; color usually dull yellowish gray, with black cloudings, under parts dirty white. It hunts in packs. It is an extremely fleet animal, excelling every other in the countries which it inhabits, except the Prong-horn. Its voice is a kind of snapping bark. The true wolves never bark, the only sound that they emit being a prolonged and dismal howl.

S. America has numerous species of *Canidæ*, some known as Aguana wolves and nearly allied to the Prairie Wolf.

WOLF, *volf*, FRIEDRICH AUGUST: the most gifted classical scholar and first critic of his times; 1759, Feb. 15—1824; b. Haynrode, near Nordhausen, Germany. He was brought up with great strictness by his father, leader of the choir and organist of the place; and was afterward sent to the gymnasium at Nordhausen, where were developed not only his restless ardor for thorough study of the ancient languages, but also the predominating trait of his character, the habit of inquiring and judging for himself, and of pursuing only one object at a time. Before leaving for the university, he had read the principal ancient authors, as well as the French, Italian, Spanish, and English; and had perfected himself in the theory and practice of music. At the Univ. of Göttingen, which he entered 1777, with the intention of studying philology exclusively, he attended the lectures irregularly, being already much given to private study. He lived very retired, and was little visited or known. However, he gave lessons to several students in Greek, also in English, for which he published Shakespeare's *Macbeth*, with explanatory notes (Gött. 1778). From Heyne (q.v.), who had once excluded him from hearing a course of lectures on Pindar, on account of the irregularity above noticed, he kept himself quite aloof. Yet, to commend himself to a man of so much influence as Heyne, he laid before him, shortly before his departure 1779, a dissertation containing some novel views regarding the Homeric poems; which, however, Heyne coldly returned. In the same year he went as teacher to the Pædagogium at Ilfeld, and there first established his fame by an ed. of the *Symposium* of Plato, with notes and introduction in German. In 1782 he became rector of the high school at Osterode, in the Harz; and 1783 prof. of philosophy and of pedagogical science in Halle Univ. In Halle, W. gradually drew a crowd of eager pupils. As academical teacher, he went on the principle that classical antiquity should be regarded chiefly as serving for a model of what is noblest and greatest in public and private life. He made it the principal duty of his office to provide able teachers and superintendents for the schools of his native country, and to deliver education, as much as possible, from the prevalent scientific pedantry. Literary labors and fame he regarded as subordinate; and his effectiveness as a teacher was unparalleled during 23 years at Halle. He nevertheless established his reputation as scholar and critic by an ed. of Demosthenes's *Oratio adversus Leptinem* (1789); and still



more by his famous *Prolegomena ad Homerum* (1795), in which he unfolded with prodigious learning and acuteness his bold theory that the *Odyssey* and *Iliad* are composed of numerous ballads or rhapsodies by different minstrels, strung together in a kind of unity by subsequent editors (see HOMER). This work made a great sensation throughout Europe. Some scholars gave out that they had long entertained similar notions regarding the Homeric poems; but Heyne insinuated that the *Prolegomena* were only a reproduction of what W. had heard at Göttingen. This gave rise to the spirited *Briefe an Heyne* (Letters to Heyne, Berl. 1797), of which the first three are models of scholarly polemic and fine irony. Some years afterward W. published the text of the four orations of Cicero, whose genuineness had been called in question by Markland in England—*Post reditum in Senatu, Ad Quirites post reditum, Pro domo sua ad pontifices, De haruspicum responsis*—appending the previous controversy, and adding striking observations of his own in proof of their spuriousness. He next attacked the authenticity of the oration *Pro Marcello*, which had long been studied by the Ciceronians as a model of eloquence and style, pronouncing it to be mere inflated declamation, in a diction hardly Latin, and which Cicero never could have written. This audacious skepticism produced no little alarm. After having refused a call 1796 to Leyden, 1798 to Copenhagen, and 1805 to Munich, his position was considerably improved, and he received the title privy-councilor. After the disasters of 1806 the univ. at Halle was dispersed, and W. was reduced to great straits; but he soon found a suitable position as member of the Acad. of Sciences at Berlin, where he was active in reorganization of the university, and became a professor. He was taken into the ministry of the interior as member of the section for public instruction; but, finding that the duties interfered with his time and strength for teaching, which he considered his mission, he continued only a short time in public office. He next gave up the work of an ordinary professor, and reserved at last only the privilege of lecturing in the univ. on selected subjects. He died at Marseille, on a journey for health. The multitudinous works of W. we cannot attempt to enumerate: they consist chiefly of critical editions of classical writings, with dissertations and annotations, often with admirable translations in German or Latin. While in Berlin he edited, with Buttmann, the *Museum der Alterthumswissenschaften* (1807–10), and afterward the *Literarische Analecten* (1817–20), which has been pronounced perhaps the best philological journal ever published. From the papers which he left, his son-in-law, Körte, published *Ideen über Erziehung, Schule und Universität* (Ideas on Education, School and University, Quedlinb. 1835).—See Hanhart, *Erinnerungen an Fr. Aug. W.* (Bas. 1825); Körte, *Leben und Studien Fr. Aug. W.'s des Philologen* (2 vols. Essen 1833); Gottholdt, *Fr. Aug. W. die Philologen und die Gymnasien* (Königsb. 1843).

## WOLFE.

WOLFE, *wûlf*, CATHARINE LORILLARD: donor to benevolence: 1828, Mar. 28—1887, Apr. 4; b. in New York; dau. of John David W. the philanthropist, and granddaughter of Peter Lorillard. She inherited \$10,000,000; and began with giving \$100,000 per annum to benevolent objects, increasing the amount afterward to \$250,000, distributed among various charities and institutions. Of her many gifts were \$100,000 to Union Coll., \$50,000 to found an Italian mission, \$30,000 to St. Luke's Hospital, New York, a large amount for a newsboys' lodging-house, schools, colleges, and churches in various states, and the American School at Athens. She built Grace House, and to this and for improvements and endowment of Grace Church in New York she gave altogether \$600,000. She built and endowed a diocesan house for the Prot. Episc. diocese of New York, at an expense of \$170,000. She sent William Hayes Ward, D.D., in charge of an archæological expedition to Asia Minor 1884. Her rich collection of paintings she bequeathed to the Metropolitan Museum, besides \$200,000. She died in New York.

WOLFE, *wûlf*, CHARLES: 1791, Dec. 14—1823, Feb. 21; b. Dublin. He was educated at Winchester and at Dublin Univ. In 1817 his celebrated lines on *The Burial of Sir John Moore*, suggested by reading Southey's impressive account of it in the *Edinburgh Annual Register*, were written; and so generally admired were they, that even while the name of their author remained unknown they had won for themselves a secure place in the memory of the British people as a singularly felicitous and touching poetical record of a noble and pathetic incident in national history. W., after qualifying himself to take orders, became, 1817, curate of Ballyclog, in Tyrone, Ireland; and afterward of Donoughmore. His devotion to his duties was extreme, and overtaxed the strength of his constitution; and he died of consumption. His poems are now forgotten, except the one beautiful piece which preserves for us the name of W.: this was attributed by guess, while he lived, to more than one of the most famous writers of the day—as, notably, Campbell and Byron.

WOLFE, JAMES: famous young English general, the hero of Quebec: 1727, Jan. 2—1759, Sep. 13; b. Westerham, in Kent. His father was a lieut.col., afterward Gen. Wolfe, an officer of merit and distinction, who served under Marlborough and Prince Eugene. From the first, the boy had resolved to follow his father's profession of arms; and when little more than 13 years old, he started to accompany the colonel as a volunteer in the unfortunate Carthagena expedition; but was prevented by illness. In 1742 he received his commission as ensign, and saw service in Flanders. In the year following he took part in the famous battle of Dettingen; and though still the merest boy, he acted in the responsible capacity of adjt. of his regt. With the army in Scotland he served as brigademajor at the battles of Falkirk and Culloden. In 1747 he was again abroad on service. At the battle of Laufeldt he was wounded; and his conduct was so distinguished



that he was publicly thanked by his commander-in-chief. He was in Scotland 1749-53, and showed admirable tact and discretion. In the mismanaged expedition against Rochefort 1757, W. was appointed quartermaster-gen. of the force. The total failure of the operations brought disgrace to nearly all concerned; but it became sufficiently known that, had W.'s prompt and daring counsels been followed, the result would have almost certainly been different; and his reputation, already brilliant, was considerably enhanced. In particular, it appears that the attention of Pitt was now first decisively drawn to W.; and marking approval of his conduct, the full rank of col. was conferred on him. In 1758 he was intrusted with the command of a brigade in the expedition against Cape Breton, under Gen. Amherst; and the great success in the capture of Louisbourg was attributed mainly to W.'s skill, boldness, and activity; so that he became known as 'the hero of Louisbourg.' Pitt was now organizing his grand scheme for the expulsion of the French from Canada; and the expedition, which had for its object the capture of Quebec, the enemy's capital, he confided to the care of W., allowing him, as far as possible, a *carte-blanche* for the choice of his subordinate officers. 1759, Feb. 17, W., now advanced to the rank of maj.gen., and commanding an army of between 8,000 and 9,000 men, set sail from England. June 26, W. landed his forces on the Isle of Orleans, opposite Quebec, and proceeded to concert his plans for the attack on it. This, of which he had shortly before written as likely to be found 'a very *nice* operation,' proved, on closer examination, one of stupendous, indeed nearly hopeless, difficulty. The system of defense adopted by his adversary, the skilful and wary Montcalm, offered him no point of advantage. In all his attempts, though seconded ably by Admiral Saunders, who commanded the fleet, he found himself completely foiled. The season was wearing fast away during which operations could be continued; and an abortive result seemed imminent of the expedition from which so much had been hoped. But at last, at daydawn, Sep. 13, W. stood, with his little army, on the Heights of Abraham, above the city, where Montcalm, sorely against his will, was forced to risk decision of the struggle by battle in the open field. Having resolved to stake all on a final effort, W. had, during the night, succeeded in scaling the cliffs at a point insufficiently guarded—an operation of such frightful risk and difficulty as in war has had scarcely a parallel. Of victory he had no doubt: his little force, now—exclusive of detachments necessarily left behind—reduced to about 5,000 men, was indeed opposed to nearly 8,000 of the enemy, besides Indian auxiliaries; but of these it was well known that only a part could be depended on as trained and veteran troops. The result justified his confidence: after a short struggle the enemy was driven from the field in complete rout; the capitulation of Quebec followed a few days afterward; and its fall decided the fate of Canada. But W. did not live to reap the fruits of his victory; he died in its very hour. In person he led

## WOLFENBÜTTEL—WOLFF.

the right; twice wounded, he refused to leave the front; a third bullet prostrated him; and he was carried, evidently dying, to the rear. He lived only long enough to know that the battle was decisively won; then rallying his last strength to give one final order, and saying, 'Now God be praised! I die in peace,' he expired, at the age of 33. The gallant Montcalm also fell, paying, with almost his last breath, the tribute of a true soldier to the valor of the troops who had defeated him.—The news of the victory was received in England with a tumult of exultation, dashed with grief for the loss of the hero to whom the nation owed it. When parliament met in Nov., the house of commons addressed the king, praying that his majesty would order a monument to be erected in Westminster Abbey to the memory of the dead soldier; where, accordingly, an *effigies* of him is seen, with allegorical adjuncts as tasteless and absurd as usual. W. was of warm affections and frank and generous nature; though his temper was somewhat eager, impulsive, and irascible, he was generally beloved; and he left the memory of a spotless character.—See *Life and Correspondence of Major-general James Wolfe*, by Robert Wright (1864); and *Montcalm and Wolfe*, by Francis Parkman (2 vols 1885).

WOLFENBÜTTEL, *vol'fén-büt'tel*: very old town in the duchy of Brunswick; on both banks of the Oker; 7 m. s. of Brunswick (q.v.) by railway. Its old fortifications have been converted into promenades. There are several churches, schools, charities, and a college. In a handsome building modelled after the Pantheon at Rome was kept the famous library of which Lessing was librarian. In 1887, however, it was transferred to a new building in the Renaissance style. It consists of nearly 300,000 vols. and more than 10,000 MSS., and contains some of the finest missals in Europe, and an immense collection of Bibles, including Luther's Bible with autograph notes. Here also are preserved the great Reformer's marriage-ring, spoon, drinking-glass, and portrait by Cranach. The cultivation of vegetables is extensive, and there are manufactures of lacquered and japanned wares, paper-hangings, leather, tobacco, and liqueurs; and some trade in grain, cattle, and linen-yarn. W. has five annual fairs.—Pop. (1885) 13,453—including the garrison.

WOL'FENBÜT'TEL FRAGMENTS: see LESSING: REIMARUS.

WOLFF, *vol'f*, JOHANN CHRISTIAN VON: German philosopher and mathematician: 1679, Jan. 24—1754, Apr. 9; b. Breslau; son of a tanner, who, though poor, made it his chief object to give a good education to his son. W., after studying at the gymnasium of Breslau, went to Jena 1699 to study theology. However, mathematics and philosophy became his favorite studies. In 1703 he began to give lectures in mathematics and philosophy, which were very numerous attended. By various works on mathematics, his name became widely known, even in foreign countries. When the incursion of Charles XII. into Saxony compelled



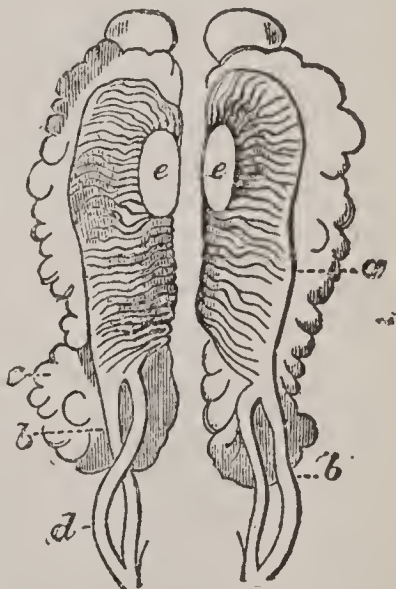
him to leave Leipzig, he received, on the recommendation of Leibnitz, a call to Halle, as prof. of mathematics and nat. philosophy. He there acquired great celebrity by his system in teaching, as well as by mathematical writings. The clearness and definiteness of propositions in his mathematical lectures were new and surprising: hence his system of metaphysical and moral philosophy, which he worked out according to this mathematical method, and published, found great approval and quickly spread through Germany: it became a kind of rage to treat all sorts of subjects in the mathematical method, with an effect often ludicrously pedantic. W., however, was violently attacked by his colleagues in Halle, especially by those theologians who favored the pietism then coming into vogue: he was declared a despiser of religion and a teacher of error; and a formal accusation was brought against him to the government: it was even insinuated that his doctrine of freedom encouraged social anarchy. By a cabinet order of Frederick-William I., 1723, W. was deposed from his office, and commanded, under pain of death, to quit Halle in 24 hours, and the Prussian dominions in two days. He departed, and met a favorable reception in Cassel, and was appointed to a chair in the Univ. of Marburg. The dispute about his philosophical system now became general, and nearly the whole of Germany took part either for or against him; while he received from abroad many marks of honor and advantageous proposals, which last he declined. The Prussian govt. soon saw reason to regret its action against him, and appointed a commission to re-examine the matter. The result was his entire justification; and when Frederick II., who esteemed him and had studied his system, ascended the throne (1740), W. was induced to return to Halle as prof. of the law of nature and nations, and with the titles privy-councilor and vice-chancellor. In 1743 he became chancellor in the place of Ludwig, and was raised to the rank of baron of the empire by the elector of Bavaria during the regency.

Before his death, W. saw his philosophy spread over Germany and a great part of Europe; but he outlived his reputation as an academical teacher. That he did service to philosophy cannot be denied. Though not enriching it by great discoveries, he directed attention to systematic method; and by treating scientific subjects in the mother-tongue, he aided in spreading that taste for philosophical speculation which has become characteristic of Germany. W. adopted Leibnitz's hypotheses and principles, which he endeavored to develop into a complete system and popularize; but though the Wolffian philosophy was an improvement on the previous scholastic Aristotelianism, its dogmatism could not stand the criticism of Kant, and it is now only a theory of the past. By his voluminous writings, partly in German, and by the immense number of his pupils, W. had a wide influence on his age, especially as counteracting pietism and mysticism, then tending to excess. The multitude and extent of his writings is marvellous, even in view only of the mechanical labor of pro-

ducing them. He treated mathematics and philosophy in a double set of works—one set in full in Latin, the other shorter as German school-books. Besides these are a great number of treatises on single subjects in physics, mathematics, and philosophy. His systematic works on the chief branches of philosophy alone amount to 22 vols. quarto.—See *Christian W.'s eigene Lebensbeschreibung* (Christian W.'s Autobiography), pub. by Wuttke (Leip. 1841); Ludovici, *Sammlung und Auszüge der Sämmtlichen Streitschriften wegen der Wolf'schen Philosophie, u.s.w.* (Collection and Extracts of the Controversies about the Wolfian Philosophy, etc., 2 vols. Leip. 1737); by the same author, *Ausführlicher Entwurf einer vollständigen Historie der Wolf'schen Philosophie* (3 vols. Leip. 1737).

**WOLFF, volf, KASPAR FRIEDRICH:** German anatomist and physiologist: 1733-94; b. Berlin. He studied in Berlin and at Halle; graduated in medicine 1759; served as surgeon in the Seven Years' War, and on invitation of Empress Catharine became prof. of anatomy and physiology at St. Petersburg, where he died. W. is noted as having established the doctrine of epigenesis, and is regarded as the founder of modern embryology: see WOLFFIAN BODIES.

**WOLFFIAN BODIES:** important organs in the vertebrate embryo, which serve only a temporary purpose, except in the lowest classes (fishes and Amphibia), in which they remain permanently. In the development of the chick, these bodies may be seen as early as the fourth day, lying along either side of the vertebral canal, from the region of the heart downward and backward, consisting of a series of tubules opening at one end into the body-cavity, and at the other into a longitudinal duct, the Wolffian duct, and corresponding with the so-called kidneys of fishes, which in reality are true persistent Wolffian bodies. On the fifth day the appendages become convoluted, and the body which they collectively form increases in mass. The appendages are then seen to possess a secreting property, and the fluid which they secrete is conveyed by the duct of each side into the urogenital sinus, into which opens also the *allantois*, a sack which, at the same time, acts as a temporary respiratory organ, and serves also as a urinary bladder; but atrophies in adult birds and mammals. Hence these organs may be regarded as temporary kidneys. In the chick, the true kidneys begin to form from the Wolffian bodies at the fifth or sixth day, and gradually increase in size as the temporary organs diminish; and at the end of fetal life, only a shrunk rudiment of those or-



State of the Urinary and Genital Apparatus in the early embryo of the bird:

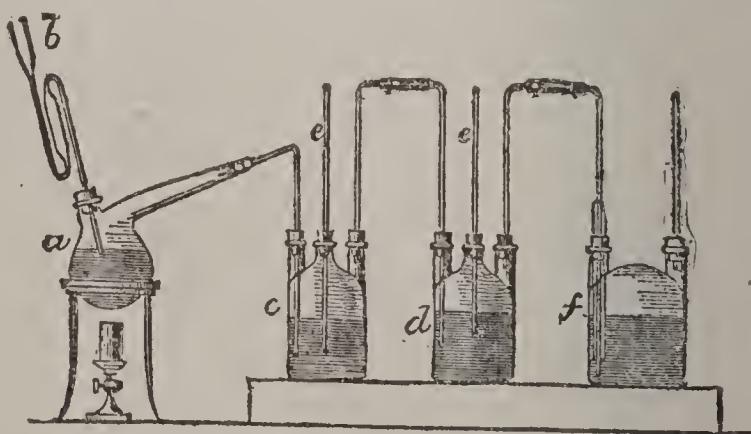
a, Corpora Wolffiana; b, b, their excretory ducts; c, kidneys; d, ureter; e, e, testes.



## WOLFFIAN BOTTLES—WOLFFIANISM.

gans can be observed. In man the process is very similar, the Wolffian bodies beginning to appear toward the end of the first month; and in the seventh week the true kidneys first present themselves. From the beginning of the third month, the Wolffian bodies begin to decrease, the kidneys increasing in a corresponding ratio; and at the time of birth scarcely any traces of the former can be seen. It was formerly believed that the essential parts of the generative apparatus—the testes in the male and the ovaria in the female—also were developed from these bodies; but this is not the fact, as they have an independant origin in a special mass of blastema peculiar to themselves, in the immediate vicinity of the Wolffian bodies.—See Balfour, *Comparative Embryology*.

**WOLFFIAN BOTTLES:** set of apparatus used in distillation of Hydrochloric Acid (q.v.). It consists of a retort, *a*, in which chloride of sodium (common salt) is submitted to the action of sulphuric acid, gradually added through the funnel *b*, and the vapor evolved passes out into the first bottle (which, in the accompanying figure, is represented as half full of water), and is absorbed by the water. This process continues till the power of absorption of the water in the first bottle ceases (in other words, till the water becomes *saturated*), when the vapor collects in the neck of the retort and in the tube *c*, till it acquires sufficient tension to force its way through the water, and enter the second bottle by the tube *d*. In turn, the water in the second bottle becomes saturated, after which the gas is forced to find its way into the third bottle through the other two by means of the connecting tube *f*. After the force of reaction in the retort has become weakened, the evolution of the gas is quickened by application of a flame, which should be gradually increased. Considerable heat being generated during absorption, it is desirable that the bottles should be immersed in cold water.



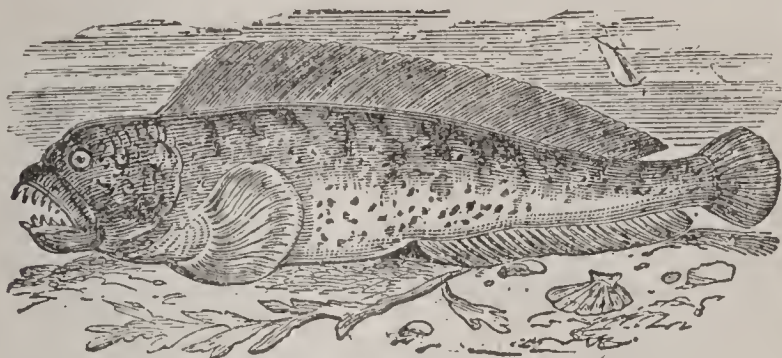
Wolffian Bottles.

The tubes *e, e* admit atmospheric air to prevent the rarefaction in the retort tending to force the contents of the bottles back into it.

**WOLFFIANISM**, or **WOLFIANISM**, *n. wólff'i-an-izm*: in *philos.*, the system developed from Leibnitzianism by Christian Wolff: see WOLFF, JOHANN CHRISTIAN VON: LEIBNITZ.

## WOLF-FISH—WOLF'S-FOOT.

**WOLF'-FISH:** fish of the genus *Anarrhichas* and family *Anarrhichadidæ*, having no ventral fins, pectorals very large, single dorsal fin extending from behind the head almost to the tail-fin, long anal fin, tail-fin rounded; head round, smooth, and blunt; teeth large and strong, not attached immediately to the jaws, but to bony processes connected with them by sutures. The jaws are powerful,



Wolf-fish (*Anarrhichas lupus*).

the front teeth resemble the canine teeth of mammals, while the vomer and palate are furnished with teeth which have the form of rounded tubercles. One species, the **COMMON W.**, called also **CAT-FISH** and **SEA-CAT** (*A. lupus*), is found from Cape Cod n., also on the coast of Europe, and is plentiful in more northern seas. It is of light-gray color, brownish on the back; the lower parts exhibiting 9 to 12 dark transverse stripes continued on the dorsal fin; also dark spots and reticulations. The skin is covered with slime. It attains the length of 6 ft., and is of formidable and repulsive appearance: it bites savagely when caught, and fishermen generally dispatch it as soon as possible by knocking it on the head. It preys chiefly on mollusks and crustaceans, which its jaws easily crush. It is often very destructive to nets, being active and powerful. Notwithstanding its ugliness, it is in esteem for the table, and is much used in Iceland, both fresh and salted; and a kind of shagreen, for bags and pouches, is made of its thick skin. In America it is used fresh, or split, salted, and smoked.

**WOLFRAM**, n. *wûlf'ram*, or **WOLF'RAMITE**, n. -*īt* [Ger. —from *wolf*, a wolf, and *rahm*, froth, cream]: native compound of tungstate of iron and manganese, from which the metal Tungsten (q.v.) is usually obtained. The proportion of the two bases varies; the more manganese the darker the streak (powder on scratching), the more iron the more brown or red. The lustre is submetallic, color dark gray or brownish black. In the United States, it occurs at Monroe and Trumbull, Conn.; also in N. C., Mo., and Nevada. **WOLF'RAMINE**, n. -*ram-in*, a mineral of a yellow or yellowish-green color.

**WOLF'S-BANE**, n. *wûlfs'bân* [*wolf*, and *bane*]: the popular name of the aconite or monk's-hood, a poisonous plant; the *Aconitum napellus*, ord. *Ranunculacææ* (see **ACONITE**).

**WOLF'S-FOOT**, n. *wûlfs'fût* [*wolf*, and *foot*]: club-moss; *Lycopodium*, which see under *Lycopodiaceæ*.



## WOLGAST—WOLLASTON.

WOLGAST, *vol'gást*: town and seaport of Prussia, prov. of Pomerania, dept. of Stralsund, and 'circle' or district of Greifswald; on the Peene, about 10 m. from its entrance into the Baltic; 33 m. s.e. of Stralsund. Owing to the shallowness of the water, only the smaller class of sea-going vessels can enter the harbor. There is a public dock-yard and a school of navigation. The chief industries are ship-building, and manufacture of candles, soap, and tobacco. There entered the port (1886) 84 vessels, of 15,139 tons; cleared 46 vessels, of 6,700 tons. The larger vessels discharge and take in cargoes at Ruden, a small island and pilot-station opposite the mouth of the Peene, known as the landing-place of Gustavus Adolphus 1630. W. is a very old town; it was strongly fortified as early as the 12th c., and was the residence of the Dukes of Pomern-Wolgast; it was taken and retaken five times 1628-75; the Russians plundered and burned it 1713, and the Swedes retook it 1715.—Pop. (1885) 7,485.

WOLLASTON, *wúl'as-ton*, WILLIAM HYDE, M.D.: English physicist: 1766, Aug. 6—1828, Dec. 22; b. East Dereham, Norfolk; second son of the Rev. Francis W., of Chiselmurst, in Kent. He was entered of Caius College, Cambridge, where he studied medicine. After practicing as a physician at Bury St. Edmunds, he removed to London; but failing in a competition for the post of physician to St. George's Hospital, he determined thenceforth never to write a prescription, 'were it for his own father,' but to apply himself to scientific investigation. This sudden resolution led him rapidly to wealth and fame, as he succeeded in making industrial application of several of his important discoveries. His researches extended over a wide field, but were fruitful pre-eminently in chemistry and optics. He discovered new compounds connected with the production of gouty and urinary concretions—e.g., phosphate of lime, ammonio-magnesian phosphate (a mixture of these two forming the 'fusible' calculus), oxalate of lime, and cystic oxide; also the occurrence in the ore of platinum of two new metals, palladium (1804) and rhodium (1805). By his ingenious discovery of a method of making platinum malleable, he is said to have amassed a fortune; and his mode of hardening steel, and some other discoveries, were very lucrative. His contributions to optics were the celebrated 'Goniometer' (q.v.), a valuable gift to mineralogists; an apparatus for ascertaining the refractive power of solid bodies; the 'Camera Lucida' (q.v.); the discovery of invisible rays outside the violet band of the spectrum; and an immensity of valuable and interesting observations on single and double refraction. He did much to establish the theory of definite proportions. To other sciences also his contributions were important, for he was the first to demonstrate the identity of galvanism and common electricity, and to explain the cause of the difference in the phenomena of each, etc. In 1793 W. took the degree of M.D., and the same year was elected a fellow of the Royal Soc., of which he became sec. 1806. W. lived alone; took no part in public affairs; and never

## WOLLASTONITE—WOLSELEY.

admitted any one to his laboratory. He died in London. His most important memoirs, 38 in number, are in *Philos. Trans.* (1800-29).

**WOLLASTONITE**, n. *wŏl'las-tŏn-īt* [after Dr. *Wollaston*, the physicist]: a mineral, consisting of silicate of lime, occurring in broad prismatic or tabular masses, of a grayish-yellow or red-brown color, found chiefly in granular limestone; tabular spar.

**WOLLSTONECRAFT, MARY**: see **GODWIN, WILLIAM**.

**WOLSELEY**, *wŭlz'li* (**GARNET JOSEPH**), Viscount, of Wolseley, K.P., G.C.B., G.C.M.G., etc.: British general, well known as Sir Garnet Wolseley: b. near Dublin, 1833, June 4; son of Major G. J. Wolseley. He entered the army as ensign 1852; served in the Burmese war 1852-3; was severely wounded in the Crimea, where he served with the 90th light infantry, and received the cross of the Legion of Honor and the fifth class of the Turkish order of Mejidieh, for his bravery there. He was in India during the Mutiny, at the siege and capture of Lucknow and the defense of Alum Bagh, and was made brevet lieut.col. In the Chinese war of 1860 W. served on the staff of the quartermaster-gen. Next year he went to Canada; successfully managed the Red river difficulty 1870, and was nominated a knight commander of the order of SS. Michael and George, and from that time was known as Sir Garnet W. On the outbreak of the Ashantee war, W. was appointed to the command; and on his return, 1874, received the thanks of parliament and a grant of £25,000 for 'courage, energy, and perseverance.' In 1875, become a major-gen., he was dispatched to Natal to superintend the affairs of the colony; 1876 was nominated a member of the Indian council. In 1878, he was made high commissioner in Cyprus; and 1879 held supreme civil and milit. command in Natal, the Transvaal, and adjacent disturbed territories. He returned 1880, May, and became quartermaster-gen. at the headquarters of the army. In 1882 he became adjutant-gen., and later in the year was commander-in-chief of the expedition to Egypt, for the successful conduct of which he received the thanks of parliament, was gazetted Baron Wolseley of Cairo, and of Wolseley in the county of Stafford, and had a large money-grant conferred on him. He was also promoted to the rank of general, and received from the khedive the grand cordon of the Osmanieh. In 1884-5 he conducted the operations for the relief of Gordon in Khartoum, for which he received the thanks of both houses of parliament, was made K.P., and raised to the dignity of Viscount Wolseley of Wolseley. In 1890, Sep., he succeeded Prince Edward of Saxe-Weimar as commander-in-chief of the forces in Ireland; in 1895 was made field marshal and commander-in-chief of the British army; and in 1902 was appointed one of the members of the new Order of Merit.—W. is the author of a novel (*Marley Castle*, 1877); and of several essays and milit. handbooks. Two vols. of *Memoirs of the Duke of Marlborough* had been completed 1891, Oct.



## WOLSEY.

WOLSEY, *wúl'zǐ*, THOMAS: cardinal and English statesman: about 1471–1530, Nov. 29; b. Ipswich, Suffolk, where, it is said, his father was a butcher. Though of humble origin, he received a good education, and at an unusually early age, he was sent to Magdalen College, Oxford, of which he became a fellow. It is said that while at Oxford he was brought into intimate relations with the great Erasmus, then in England. He afterward acted as tutor to the sons of the Marquis of Dorset, through whose favor he became rector of Lymington, in Somersetshire, 1500. On one occasion he appears to have fallen into difficulties. At a fair in the neighborhood, it was his misfortune, it is said, to be found drunk and disorderly; and by a certain knight of the shire, Sir Amias Poulet, he was put in the stocks for the misdemeanor. That he figured in the stocks is certain; but of the drunkenness there is no adequate evidence. When the power to retaliate came to him, he took his revenge on Sir Amias by having him imprisoned for six years.

In Somersetshire W. became intimate with Sir John Nafant, through whose influence he was appointed chaplain to Henry VII., with whom he speedily ingratiated himself. Being sent by the king on a special embassy to the continent, he acquitted himself so dexterously that he rose still higher in favor; and 1508 the deanery of Lincoln was conferred on him. The next year Henry VIII. succeeded to the throne. From this time forward the life of W. is in effect the history of the England of which he implicitly became the ruler. From Henry he received unbounded favor and confidence; and his influence in the conduct of affairs was such as has seldom been exerted by a subject. The most valuable ecclesiastical preferments were showered on him; and finally, in the same year (1515), he obtained the bishopric of Lincoln and the archbishopric of York. The year following, the dignity of cardinal was conferred on him by the pope, who, not long afterward, appointed him legate also. Besides these ecclesiastical honors, he was made by the king his prime minister, and lord high chancellor of England. From this time (1515) till his forfeiture of the royal favor, W. was one of the most important men in Europe; and in England his power was almost without limit. The revenues from his various offices were princely; and they were enlarged by subsidies from foreign potentates, eager to conciliate his favor. He did not bear his honors meekly; he affected a sumptuous magnificence, and a state almost royal, while his bearing was arrogant and imperious. He openly aspired to be pope; and more than once there seemed ground for supposing this crowning object of his ambition to be within his reach. It has been surmised that his resentment against Charles V., to whom he attributed his disappointment, determined, to a considerable extent, the foreign policy of the country.

Such a man could not fail to have many enemies, eager to discredit him with his royal master; and an occasion at length came. To the project on which the king had set

## WOLVERENE—WOLVERHAMPTON.

his heart, of divorcing Queen Catharine and marrying Anne Boleyn, W. showed himself hostile; of the latter part of the scheme he was known to disapprove; and his negotiations for securing the consent of the pope to the divorce seemed to the king dilatory and half-hearted. Henry, where his passions were interested, could not brook contumacy of this kind; his displeasure was carefully fanned, and the disgrace of W. was accomplished. In 1529 he was stripped of all his honors, and driven with ignominy from the court. Symptoms of relenting showed themselves next year in the mind of the monarch; and it seemed as if W. might again be taken into favor. The prospect proved delusive. Being at the time in Yorkshire, the archbishopric having been restored to him, with others of his minor preferments, he was arrested on a charge of high treason, and ordered to be conveyed to London for trial. On his journey he was attacked with dysentery, and died at Leicester Abbey.

The faults of W.'s character are great and obvious; but he was not without redeeming qualities. Haughty and insolent to his enemies and to those whose claims ran counter to his own, to his dependents and inferiors he was generous and affable; and not a few of them showed their sense of this by devotion to him in his misfortunes. Of learning, he was a liberal and enlightened patron; and the endowment of Christ-Church College, Oxford, remains to attest this. He was a man of large and splendid capacity; and he seems, on the whole, to have been a diligent, faithful, and salutary counselor and servant of the monarch who so long and entirely trusted to him. His magnificent revenues were expended largely for national or state purposes. It has been said of W. that he found the foreign policy of England insular, and left it European.—There are Lives of W. by Cavendish (1667), Fiddes (1724), Galt (1812), and Martin (1862).

**WOLVERENE**, *wûl-vêr-ên'*, or **WOLVERINE'**, n. -î'n' [from *wolf*, with a dim. termination]: a carnivorous quadruped of the northern parts of Europe, Asia, and America; the Glutton (q.v.).

**WOLVERHAMPTON**, *wûl-vêr-hămp'ton*: municipal and parliamentary borough of Staffordshire, England; 13 m. n.w. of Birmingham, 16 m. s. of Stafford, 126 m. n.w. of London. W. is the most populous town of its county, and a centre of iron manufactures and tin-plate goods. Of its numerous churches, that of St. Peter's, built in the 14th c. and restored 1862-65, is a stately edifice, with a lofty embattled and pinnacled tower. The leading public schools are a grammar school, founded 1714; an Orphan Asylum; and a School of Practical Art, opened 1854. Among its philanthropic institutions the chief is a General Hospital and Dispensary, having 100 beds, and, like the Orphan Asylum, supported by voluntary contributions. W. has quarter sessions of its own, a spacious cattle-market, a market-hall, a handsome town-hall, a system of deep sewerage, and an abundant water-supply managed by the corporation. There is a handsome bronze equestrian



## WOMAN'S CHRISTIAN TEMPERANCE UNION.

statue of Prince Albert in Queen Square. The town possesses an Exchange, where iron-masters and merchants assemble; and an Agricultural Hall, for the use of farmers and corn-dealers. W. stands on the w. edge of the extensive coal and iron-mining district of s. Staffordshire, and is the metropolis of that district. On the s. and e. the vicinity is covered with coal mines, iron-stone pits, blast-furnaces, forges, rolling-mills, and foundries; but on the n. and w. it is rural and picturesque. Its chief manufactures are tin-plate and japanned goods (14 manufactories), enamelled hollow wares, locks and keys, edge-tools, iron brazery and galvanized iron goods, gas and water tubes, cables and railway fastenings, iron-foundry goods, machinery, mills, cut nails, tips, cast hinges, electroplate and papier-maché goods, brass castings, and finished iron. Besides the hardware factories there are flour-mills and chemical and artificial-manure works. The hardware manufactured at W. is remarkable for beauty of finish and genuineness of workmanship. The town has unusual facilities for communication and transport, and is the centre of a number of converging lines of railway. Its market-day is Wednesday, under a charter of 1258.—W. was originally called Hampton, and afterward Wulfrune's Hampton (of which its present name is a corruption), from the fact that Wulfrune, sister of King Edgar, founded here (996) the church and college of which St. Peters is the modern representative.—Pop. (1861) municipal borough 60,860; (1871) 68,291; (1881) 75,738; (1891) 82,620; (1901) 94,180.

**WOLVISH**, a. *wûlv'ish*: in *OE.*, wolfish.

**WOMAN**, n. *wûm'ân*, plu. **WOMEN**, *wîm'ên* [*OE.* *wimmon*; *AS.* *wifman*, a woman—from *AS.* *wif*, a wife, and *man*, a person or being, the *AS.* *man* being of both genders (see **WIFE** and **MAN**)]: the female of the human race; a grown-up female; a female attendant: **V.** (with an indefinite *it*) to play the part of the woman; to act timidly; to make one act timidly; to address as 'woman.' **WOMANED**, a. *wûm'ând*, in *OE.*, accompanied by or united with a woman. **WOM'ANHOOD**, n. *-hûd*, the state or collective qualities of woman. **WOM'ANISH**, a. *-ish*, having the qualities of a woman; effeminate. **WOM'ANISHLY**, ad. *-lî*. **WOM'ANISHNESS**, n. *-nêš*, the state or quality of being womanish. **WOM'ANKIND**, n. *-kînd*, the female sex; women collectively. **WOM'ANLIKE**, a. *-lîk*, like a woman. **WOM'ANLY**, a. *-lî*, feminine; not masculine; suiting or becoming a woman; not childish: **AD.** in the manner of a woman. **WOM'ANLINESS**, n. *-nêš*, the state or quality of being womanly. **WOMAN'S RIGHTS**: see **WOMEN'S RIGHTS**.

**WOMAN'S CHRISTIAN TEMPERANCE UNION, NATIONAL**: see **TEMPERANCE UNION, NATIONAL WOMAN'S CHRISTIAN**.

## WOMB.

WOMB, n. *wóm* [Goth. *vamba*; AS. *wamb*; Dan. *vom*; Icel. *vömb*, belly, womb: Ger. *wamme*, dewlap, paunch: Dut. *wam*, the belly of a fish]: that part of an animal in which the young is conceived and nourished till birth; the place where anything is produced; any large, deep, or obscure cavity; in *OE.*, the belly: V. in *OE.*, to inclose; to breed in secret. WOMBED, a. *wómbd*, having a womb. WOMBY, a. *wóm'i*, in *OE.*, capacious.—The *Womb* or *Uterus* is, in the human female, a flattened, pear-shaped organ, whose position and various parts are shown in fig. 1. It consists of a body, (1), a base or fundus (2), a neck or cervix (3), and a mouth or *os uteri* (4). It lies in the line of the axis of the outlet of the Pelvis (q.v.), with base directed

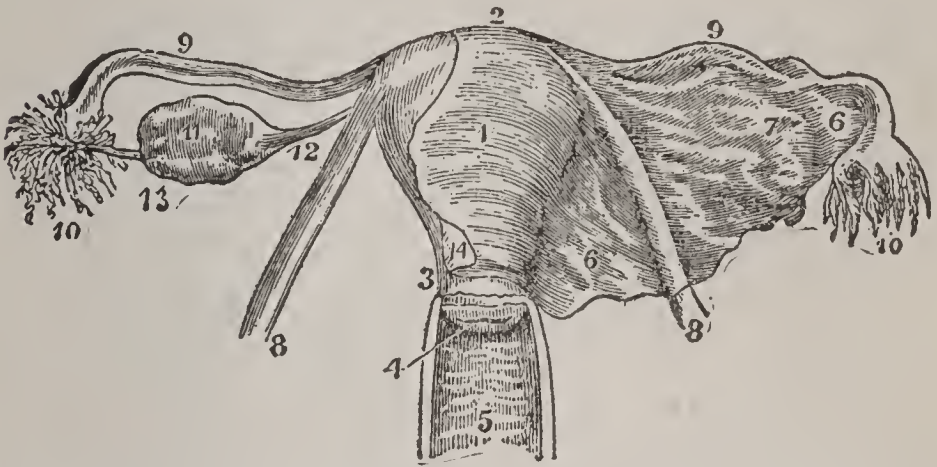


Fig. 1.—The Uterus and its appendages viewed on their anterior aspect:

1, the body of the uterus; 2, its fundus; 3, its cervix; 4, the os uteri; 5, the vagina laid open; 6, the broad ligaments of the uterus on left side; 7, a convexity of the broad ligament caused by the ovary; 8, 8, the round ligaments; 9, 9, the Fallopian tubes; 10, 10, their fimbriated extremities; 11, the right ovary; 12, the utero-ovarian ligament; 13, the Fallopio-ovarian ligament, on which some small fimbriæ are continued for a short distance; 14, peritoneum of anterior surface of uterus. The membrane is removed on the right side to show the parts imbedded in its folds.

upward and forward, and the neck directed slightly backward. (See fig. 2.) In its unimpregnated condition, which we are now considering, it is about three in. in length, two in breadth, and one in thickness, and weighs about an ounce and a half. On laying it open, or exploring its interior by introduction of an instrument through the *os uteri*, its cavity is found very narrow, and to contain a little mucus. Its walls are nearly half an inch thick, and are composed mainly of muscle-cells and fibres running irregularly in all directions except round the *os*, where they make a partial sphincter. This muscular coat, which constitutes the bulk of the organ, is covered externally with a serous coat, derived from the peritoneum, and is lined internally by a mucous coat continuous with that of the canal called the *vagina*, by which the interior of the womb communicates with the outer surface of the body. This mucous coat abounds in small mucous follicles and is provided with ciliated Epithelium (q.v.). The neck or *cervix* of the womb is distinguished from the body by a well-marked



## WOMB.

constriction. The mouth or *os* projects slightly into the vagina (which is shown as laid open anteriorly in the figure). This opening is nearly round in the virgin, and transverse after parturition. It is of considerable size and is named the *orificium uteri externum*; it leads into a narrow canal which terminates at the upper end of the *cervix* in a smaller opening, the *orificium internum*, beyond which is the shallow triangular cavity of the womb, of which it forms the lower angle, while the two upper angles, which are funnel-shaped, constitute the beginning of the Fallopian Tubes (q.v.), whose apertures are so small as to admit the passage of only a fine bristle. The blood-vessels and nerves

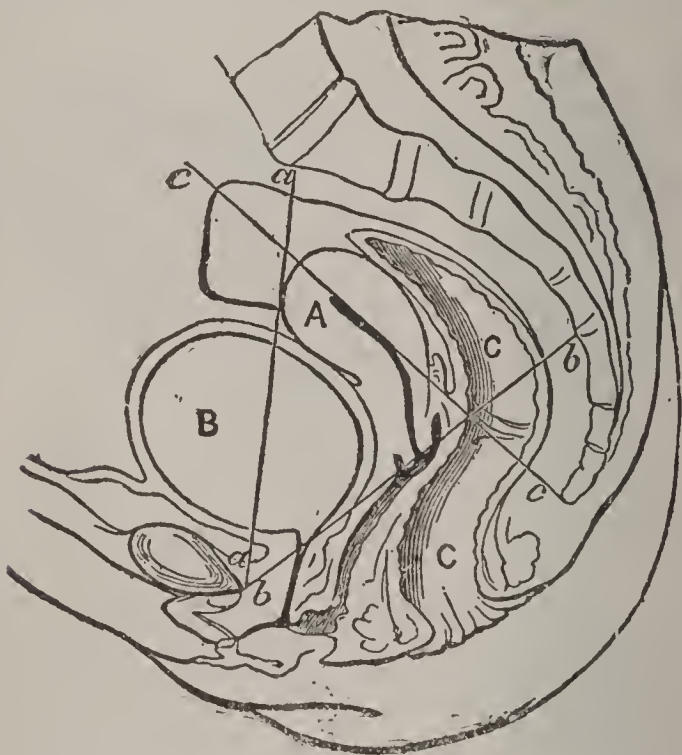


Fig. 2.—Section of Pelvic Viscera, with the parts in position:

A, the uterus; B, the bladder; C, the rectum (the latter two being moderately distended;) *aa* is a line from the lower border of the symphysis pubis to the promontory of the sacrum; *bb*, from the same spot to the lower margin of the fourth sacral vertebra; *cc*, the axis of the uterus. When prolonged, it runs three-quarters of an inch in front of promontory of sacrum, and hits the end of the coccyx.

enlarge in a very remarkable way during pregnancy, to adapt themselves to the increased wants of the organ, which, at the ninth month of utero-gestation, weighs from two to four lbs. The term *appendages to the uterus* is given to the Fallopian Tubes and Ovaries (q.v.), which are inclosed by the lateral folds of the peritoneum called the broad ligaments. The womb is suspended in the pelvic cavity in such a way as, by its mobility, to escape rude shocks from without, or disturbance from the varying conditions of the surrounding viscera, while allowing of its increasing in bulk with comparatively little discomfort when pregnancy occurs. This is effected by several duplicatures of peritoneum, containing variable quantities of fibrous and muscular tissue, and known from their form or

connection as the *broad*, the *round*, the *utero-sacral*, and the *utero-vesical* ligaments.

The uterus is an organ peculiar to Mammalia, and in comparatively few of them (excepting the Apes and Cheiroptera) is it of the simple oval or triangular form above described. It is *two-horned* in the Ruminantia, Pachydermata, Solipedia, and Cetacea; and it is said to be *divided* where it has only a very short body, as in most of the Carnivora and Edentata, and some Rodentia, which speedily divides both externally and internally, and is continuous with the oviducts or Fallopian tubes. The uterus is *double* in some of the Edentata, and in most of the Rodentia, including the mouse and hare; in which each Fallopian tube passes into an intestiniform uterus, which has two completely distinct openings near each other within the vagina. In the Marsupiatia and Monotremata the modifications of this organ are still more singular.

The chief offices or functions of the womb may be classed as those which relate to (1) Menstruation (q.v.), (2) Insemination, (3) Gestation, and (4) Parturition. — See last vol. of the *Cyclopædia of Anatomy and Physiology*.

WOMB, DISEASES AND DERANGEMENT OF THE: ailments of the womb, especially in the pregnant or the puerperal state: for some of these, e.g., *Phlegmasia Dolens* and *Puerperal Fever*, see the special titles. Many of these diseases may be traced to pregnancy, miscarriage, or severe delivery, occurring months previously. A common result of inflammation that often succeeds miscarriage or a bad delivery is to check that process of involution by which the womb ought to be restored in a few weeks to its size and condition previous to the pregnancy. How inflammation acts in interrupting these processes is not easily explained; but, after it has passed away, its effects may remain in the enlarged size and altered structure of the womb, changes which render it likely to suffer from the alternation of activity and repose to which the female generative system is liable. In this condition the enlarged and heavy uterus is very likely to become prolapsed, or to become a seat of permanent congestion or chronic inflammation; and excessive menstruation and a feeling of weight in the pelvis are almost always present. Besides this form of enlargement, there is a far less common form, in which the enlargement of the womb takes place independently of previous pregnancy, and is the result of true hypertrophy. The symptoms are, according to West, 'a sense of weight in the pelvis, pain usually of a burning character, hemorrhages having gradually come on, and forced themselves by their slowly increasing severity on the patient's notice.' The treatment is much the same in both these forms of enlargement—viz., the recumbent position on a hair or spring mattress, attention to the bowels, and local leeching every fortnight for several months, together with the careful use of iron associated with small doses of iodide of potassium. Temporary separation from the husband's bed should be insisted on.



## WOMB.

There is also a form of hypertrophy which is confined to the neck of the womb, which occasions great discomfort to the patient, and acts as a mechanical impediment to sexual union. In these cases no relief can be afforded except by a surgical operation.

From these results of 'simple errors of nutrition,' leading to increased growth of the organ, we pass to the debatable and much-trodden ground of *inflammation of the womb*. *Acute inflammation* of the unimpregnated womb may arise from unaccustomed and excessive sexual intercourse, sudden suppression of the menstrual discharge, extensions of gonorrheal inflammation, etc.; but, as it is comparatively rare and seldom dangerous, we pass to an affection which by most practitioners is regarded as one of the commonest — *chronic inflammation and ulceration* of the neck of the womb. A French physician, Recamier, invented an instrument—the speculum—for application of local remedies to the neck of the womb in cancer; but the light which this instrument threw on uterine conditions generally led to the conclusion that leucorrhœal discharges (popularly known as *the whites*) were often derived from, and associated with, various morbid appearances of the mouth of the womb, and could often be removed by remedies directed to that part. Almost ever since the speculum came into general use, a party of practitioners have denied the very existence of various morbid conditions which the employers of the instrument declared they saw with its use. The first party reject the recent modes of investigating uterine diseases, take small account of the new facts regarding *local* disease, and regard uterine ailments as resulting from constitutional derangements and therefore requiring general treatment. Now, though the view that the local disease is all may not be universally true, the opposite view is certainly untenable.

The conclusion which Dr. West draws from prolonged investigation is, that 'the condition of so-called ulceration or abrasion of the os uteri is far from infrequent, even in cases where no uterine symptoms were complained of during life; but that it is usually unassociated with other important affections of the uterus, such as may be supposed to be the effects of inflammatory action; and, further, that such affections do not seem to be readily excited by causes acting on the neck of the womb, either when displaced, or when the organ is in its natural position.' Since uterine pain, disordered menstruation, and leucorrhœal discharges—symptoms usually associated with ulceration of the mouth of the womb—are observed almost as frequently *without* as *with* ulceration, it may be fairly inferred that this ulceration is neither a general cause of uterine disease, nor a safe index of its progress; and though the local application of caustic to the os uteri is doubtless often successful in restoring the patient to health, it must not be considered as a general rule that the attempt, by local remedies, to remove this condition is the only point in the treatment of uterine disease. There is no doubt that, in the great majority of these cases (except a few of the more severe),

## WOMB.

temporary separation from the husband's bed, the recumbent position (which facilitates the return of blood from the womb and adjacent parts), due attention to the diet and state of the digestive organs, and the use of injections of nitrate of silver, which may be applied by the patient, are sufficient in a few weeks to effect a cure. Chronic uterine inflammation of more general nature (as of the interior or body of the womb), with very similar symptoms, is not rare. The disease in the acute form may require applications to the womb itself; in the usual chronic form, the pain in the back may be relieved by such liniment or plaster as the medical adviser will prescribe. The same remark applies to the irritability of the bladder, which is a common symptom, and usually associated with abundant phosphatic deposits in the urine. The tepid hip-bath may be used with benefit. The same general rules given above as to rest, diet, etc., must be observed. Under the best management, a tendency to relapse is liable to occur at each monthly period; and after several such relapses the womb is found (on surgical examination) to be enlarged and hardened, and less movable than natural. This condition is best removed by careful and prolonged use of bichloride of mercury in small doses, which, as it is a deadly poison, must be taken only under professional advice; but the pain in the groin which usually accompanies this change may be relieved or removed by application of a small blister. The profuse discharge—both menstrual and leucorrhœal—is best relieved by chalybeate preparations, of which the following is a useful and favorite compound: Take of sulphate of iron, 6 grains; sulphate of magnesia (Epsom salts), 3 drams; dilute sulphuric acid, half a dram; syrup of orange-peel, half an ounce; caraway-water, sufficient to make a mixture of 6 ounces, of which 1 ounce may be taken thrice daily, after meals; or, if there be much hemorrhage, a mixture of alum and sulphate of iron (4 grains of the former to 1 of the latter, dissolved in a small tumbler of water) may be taken three times a day. A hip-bath, containing half a lb. of alum to every gallon of water, is often very useful as an astringent: it should be taken in the morning before dressing, and the patient should remain in it at least a quarter of an hour. For the first time or two, the water may have the chill just taken off. The same importance is not at present attached to vaginal injections as when it was believed that the vagina (and not the womb) was the main source of leucorrhœal discharge. In a case of leucorrhœal discharge of long standing, an excellent astringent injection may be formed by dissolving two drams of tannin and half an ounce of alum in a quart of water. Special forms of vaginal syringes are sold for this purpose. The application of caustics to the mouth of the womb must be left solely to the medical attendant.

We pass to a brief notice of the occasional *misplacements* of the womb. The singular mobility of this organ (without which pregnancy would be almost an impossibility) exposes it to the risk of displacement to such a degree as often



to occasion great personal discomfort. As all the causes which tend to produce displacement (e.g., increased weight of the organ during pregnancy, pressure of the superincumbent viscera, etc.) act in a downward direction, the obvious tendency of the womb is to be thrown downward, or to suffer *Prolapsus* (q.v.), an affection which, in its extreme degree, when the organ is more or less protruded externally, is termed *Procidentia*. Causes sometimes come into action which incline the upper part of the uterus either backward or forward, giving rise to *retroversion* and *anteversion*, instead of mere prolapse.

The tendency of the womb to hypertrophy has been noticed at the beginning of this article; its individual tissues have a similar tendency to overgrowth at particular parts, giving rise to tumors or outgrowths, which are more common in this than in any other organ. Under this head are several varieties of *Polypus*, which differ essentially in structure, but all of which are invested by the mucous membrane which lines the uterus, and are liable to be the source of hemorrhage. Their removal by surgical means is generally not difficult. Much more important is the *Fibrous Tumor*, which is frequent, serious in effects, and very slightly amenable to treatment. These tumors are of spherical form and firm texture, resembling that of the womb itself, and occur usually in groups; several being frequently present, while one or two are considerably larger than the others. The symptoms to which they give rise vary extremely, according as the chief tumor lies on the outer part of the womb, and grows into the abdominal cavity, or is developed within the walls of the womb, or projects into the interior. They may be of almost any size, cases being on record in which they weighed 70 to 80 lbs. In regard to the symptoms of this affection, it must be premised that sometimes these tumors exist without exciting any disturbance, and that growths on the outer surface give rise to comparatively unimportant derangements, compared with those which are imbedded in the walls, or occupy the cavity of the womb. It will be readily understood that women who have passed the change of life (as it is popularly called) suffer less from these tumors than younger women. The diagnosis of fibrous tumor is effected partly by manual and instrumental examination; and partly by the symptoms—such as (1) hemorrhage occurring in about 50 per cent. of cases independently of their nature; (2) disturbance of the menstrual discharge in 62 per cent. of cases, the discharge being usually excessive, and often painful; (3) pain, usually constant, and occasionally only at the menstrual period, described by some patients as a burning sensation, by others as a sense of bearing down, and by a few as occurring in paroxysms of intense agony; (4) dysuria—pain in voiding urine, or difficulty in discharging it, or frequent desire to pass it. It is usually hemorrhage or inability to void the urine that first directs the attention of the patient to her malady. Its tendency to excite abortion often leads the physician to suspect its presence. Although, as we previously mentioned, this is

an affection little amenable to treatment, a woman with these symptoms should at once consult a physician (if possible, the physician-accoucheur to a large hospital), who, by his advice as to the general management of the case, especially during the menstrual period, may do much to palliate her sufferings. Iodine, bromine (and certain mineral waters containing these elements), and mercury have been vaunted as specifics, but nothing positive can be said regarding their successful action. But though the action of medicines on these growths is avowedly uncertain, nature in this as in many other cases frequently strives toward a more or less complete cure—e.g., if the tumor is pediculated and in the uterine cavity, the pedicle may finally give way, and the tumor may be expelled; or certain changes may take place in the interior of a tumor, leading either to its disintegration and elimination, or to its conversion into a chalky mass, which, though not eliminated, induces no local disturbances. These spontaneous cures are not rare, though we have scarcely the right to lead the patient to expect them in any special case. Certain surgical operations formerly accompanied with much danger to the patient may now be strongly and hopefully recommended.

We conclude with a few words on a disease—one of the most painful and hopeless of the disorders to which humanity is liable—*cancer of the womb*. It is a disease whose leading features are pain rising almost to the intolerable, attended by accidents which render the sufferer loathsome to herself and to her attendants; the general health broken down by the action of the same poison as produces the local suffering, and all tending surely, swiftly, to a fatal issue. The three most constant symptoms are pain, and hemorrhage, and discharge. From an examination of 132 cases by one eminent physician, the first symptom was found to have been,

In 58 instances, or 43·9 per cent.,				hemorrhage without pain.
" 26	"	19·6	"	pain of various kinds.
" 18	"	13·6	"	hemorrhage with pain.
" 18	"	13·6	"	leucorrhœa or other discharge without pain.
" 12	"	10·3	"	pain and discharge sometimes offensive.

The treatment is divisible into the *palliative* and the *curative*, the palliative being directed toward the three great symptoms, and the general symptoms of the cancerous cachexia (or constitutional state accompanying the local cancer); while in the curative is included the operation of extirpating the whole womb, or removing the neck of the womb by ligature or excision.—It is difficult to speak with accuracy regarding the frequency of this disease: according to Tanchou, a French pathologist, cancer of the womb is more frequent than that of the female breast in the rate of 26 to 10. The same writer calculated, from ten years' observation of the French records of mortality, that this disease causes 16 per 1,000 of all female deaths. The disease is very rare before the 25th year, and by far the most common period of its appearance is between the



## WOMBAT—WOMEN.

ages of 40 and 50 years. Its average duration is 16 or 17 months, but it may prove fatal in 3 or 4 months.

WOMBAT, n. *wŏm'băt* or *wŏm'ăt* [a corruption of the native name *wombach*]: an Australian marsupial burrowing mammal of the genus *Phascolomys*, constituting the family *Phascolomydæ*, abounding chiefly in mountainous districts of New South Wales, Victoria, S. Australia, and Van Diemen's Land, and in the islands of Bass's Strait. In many of its characters, it resembles the *Rodentia*. The incisors are two in each jaw, long and chisel-like; they are hollow at the base, and continue to grow as they are worn away; there are no canine teeth; and the molars are five on each side in both jaws. There is a wide gap between the incisors and the molars. The W. is an animal of clumsy form, having stout limbs and a blunt muzzle. It is 2 or 3 ft. long, plump, with thick coat of long, grayish brown, coarse, woolly hair; head large, flat, broad, with small eyes and ears, upper lip cleft; feet five-toed, claws long, except those of the inner toes of the hind feet; tail very short. It is plantigrade, and the soles of the feet are broad and naked. It is nocturnal in its habits, slow in its motions; feeds on vegetable substances, and digs up roots with its claws; it makes its abode in holes among rocks, or in burrows dug by itself. It produces three or four young at a birth. It is a creature of little intelligence, but gentle, and easily domesticated to a certain extent, not seeming to care much for any change of circumstances, so long as



Wombat (*Phascolomys wombat*).

its wants are supplied. It shows considerable snappishness, however, if provoked. Its flesh is preferred to that of any other quadruped of Australia. It is generally fat, and in flavor resembles pork.

WOMEN, n. *wīm'èn*: plu. of WOMAN (q.v.).

WOMEN, COLLEGIATE INSTRUCTION FOR: see COLLEGE—*Colleges for Women*: CORNELL: ETC.: also YALE.

WOMEN, MEDICAL EDUCATION OF: see MEDICAL EDUCATION OF WOMEN,

**WOMEN'S RIGHTS:** political and social functions, duties, and privileges, claimed for women in equality with those exercised by men. Since the publication of an article in the *Westminster Review*, 1851, on the subject of the enfranchisement of women, the agitation for women's rights has in Great Britain, and to a greater extent in the United States, attained the dimensions of a political movement. The subject has become one of general interest. The following is an account of the claims included in women's rights, and a brief statement of the chief arguments by which those claims are supported:

1. *The Political Rights of Women.*—The right to vote is claimed in accordance with the political principles that are held conclusive in the case of men. The argument applies with peculiar force to a democratic constitution. Democracy involves two ideas: it is a protest against privilege and against despotism; it maintains that every individual is born with an equal right to the protection and consideration of the law; and it affirms that every one must have a vote in order to secure this fundamental right. The practice in the United States shows a gradual approach to those principles: the negroes were long refused the benefit of them; but the privilege founded on color has perished, and there remains now only the privilege founded on sex.

In England, the right to vote has been made to rest on the principles of English law. A petition of women to the house of commons set forth that the possession of property in that country carries with it the right to vote in the election of representatives in parliament. From the earliest times, the principle of the English constitution, and the spirit of the English people, have required that no man's property should be taken for the purposes of government without his consent. Since, therefore, the English law permits women to hold and manage property, it seems anomalous and inconsistent that it should refuse them a vote to protect their property from inordinate taxation. Other persons allowed by the law to hold property, but excluded from the suffrage, are minors, idiots, lunatics, and criminals. But the principle of disqualification in those cases does not apply to women. Moreover, there is alleged to be historical evidence that in England women have voted both in counties and in boroughs. The disuse of the privilege is traced to historical causes. Such was the violence of the time, that women were often unable to administer their property, and it was natural that they should take little part in elections. Besides, the right to vote was at first regarded, not as a privilege, but as a burden; for the power of the commons was low, and the expense of paying members of parliament was considerable. The disfranchisement of women is therefore held to be an anomaly in the constitution, as it was an accident in history.

The objections to female suffrage are various. It has been said: 'There exists, as it were, a tacit concordat guaranteeing to the weaker sex the protection and deference of the stronger, on one condition only: that condition is the political dependence of women.' This asserts a



## WOMEN'S RIGHTS.

claim on the part of men to make laws for women, in return for protection and deference. Now, protection to person and property every one has a right to who obeys the laws and contributes to the support of the government. The reason for refusing votes to women must lie deeper. It may be said that women, being weak, are at the mercy of men; and that men abstain from abusing their superiority only on one condition—viz., that women shall have no legal rights except those that men are pleased to give them. In the last resort, the rights and privileges of any class of men depend on their might. The nobility established their privileges when they had power: the working class has been admitted to the franchise because its power has increased: but women have no physical power to enforce their rights. If rights are to be measured by might, women will occupy the bottom of the scale: this is their position among savages. But, as civilization has advanced, men have learned to renounce the advantage of their physical superiority, and freely to give women privileges that could not have been extorted. It would therefore seem that the rights women actually possess do not depend on, and are not to be measured by, their physical strength. The rights of women flow from the prevailing sense of justice, and justice now means that the interests of women be consulted with as much impartiality as the interests of men. An unjust preference of either would be mischievous to both. Since, then, the interests of women should be fairly considered, what reason can there be to prevent them voting, and thereby intimating their views of their own interests?

Another objection to the enfranchisement of women is, that women have no business with politics, and that politics would withdraw them from their proper duties. Is this apprehension well founded? Granting that domestic life is the proper sphere of women, is it really impossible to unite an interest in politics with attention to a family? Upon this subject we are not altogether without experience. In many churches on both sides of the Atlantic, notably in the great dissenting churches in Scotland, women, though excluded from office, vote equally with men in the appointment of ruling elders and ministers, and in everything that is decided by a popular vote. But this privilege has not 'hardened' them, or made them 'unfeminine,' or interfered with their household work. On the other hand, it has largely contributed to the success of the voluntary system, and to the strength of the church. The chimerical nature of the alarm felt on this subject has been illustrated by the objections that might be made against allowing clergymen to vote. We should be told that clergymen have no business with politics; that it is their province to attend to spiritual matters, and that they ought to confine themselves to their proper sphere; that, if they were permitted to participate in political affairs, it would lessen the sanctity of their character; that the passions roused by political contests are inconsistent with that spirit of meekness and holiness which we look for in preachers of the gospel. Women are not wholly excluded from politics. In some

## WOMEN'S RIGHTS.

countries a woman may be sovereign; and history affords many examples of women that have had high capacity for government. Women in England, if they have the same qualification as men, have parochial votes. And few would go so far as to propose that women should not only be shut out from public affairs, but also be kept ignorant of politics. Even if family-life be made their sole occupation, it surely is not to bound the horizon of their knowledge and sympathies.

The remaining objections may be taken together. They are of the same kind as those formerly employed against the enfranchisement of the working class. They are briefly: That the interests of women are not neglected, for they are represented by their male connections; that women are ignorant of politics; that they would be exposed to intimidation at home, and to violence at the polling-booths; and, lastly, that women do not want votes. It is not allowed that women are sufficiently represented by their male connections. Such indirect influence is not considered, in other cases, to be a reason for withholding the suffrage. Rich men have great indirect influence, but they have also votes. It is an old argument that operatives were represented by their employers; but that argument never convinced the operatives, and it has now ceased to affect the legislature. Why, then, should a *vicarious* representation, repudiated by every class of men, be considered sufficient for women? On the contrary, if women had votes, their interests would be better attended to, because no member can disregard with impunity any important section of his constituents. It would be the policy of statesmen to devise and carry out measures for their benefit.

But, it is said, women are ignorant of politics. This objection has lost much of its former weight. Educated women are surely not behind many of the male voters in political knowledge. Still, women, in general, know less of politics than men. They are constantly told that politics form no part of their business, and their opinions, like those of non-electors, have little direct and palpable influence on affairs. Political knowledge generally follows political power. Women have not the stimulus that acts on men; they have not the knowledge that their opinions form part of the legislative power.

There is little reason to fear that the possession of a vote would expose women to coercion and improper influence. The law has already defied a more serious danger. It permits women to hold property, and it trusts its ability to protect them from the importunities of relations. If women can defend their property from greedy relatives, they will be no less able to give independent votes. The objection that women would be exposed to violence at the polls is not formidable. If this were the fact, it would be no argument against female suffrage; it would be an argument against the management of the polls. Should the police, however, be unable to protect female voters, there is the easy resource of voting-papers.



## WOMEN'S RIGHTS.

The last objection is, that women do not want votes. A large number have from time to time petitioned various legislatures in favor of extending the franchise to women; those petitioners represent a very much larger number, who are kept back by the various social checks that prevent women taking part in political agitation. A proposal that has force with men simply on the ground of justice may be expected to find still more favor with women, since their interest is ranged on the same side.

The claim of women to the suffrage is not without support from practical considerations. History teaches that women must have votes in order to protect their interests; men, through all the vicissitudes of history, have shown a constant preference of their own interests.

In education, women have suffered serious disadvantages. Till recent years there was no provision made for giving them the high education that men value; accordingly, men had almost a monopoly of educated labor. But of late great advance has been made in providing for women's higher education. Girton College, transferred from Hitchin, was established at Cambridge, England, 1873, and Newnham College 1875. The university agreed to try the girl undergraduates from these colleges by the same examinations as the men students; and in 1881 it was agreed that, admitted under certain conditions to the univ. examinations, they should receive certificates showing the position they would have obtained in the general univ. lists. Oxford has Clare Hall and Lady Mary's Hall for female students. In the United States, institutions, of which Vassar College, Wellesley College, Mt. Holyoke, Smith, and Bryn Mawr are examples, offer women an education as high and thorough as that given in the best colleges for men. Michigan Univ., Cornell Univ., and others of similar rank, have long admitted students without discrimination of sex: Yale Univ. in 1892 opened all its post-graduate courses, with their degrees, to women on the same terms as to men.

It is also claimed that the law is unfair to women, especially the law of marriage, so long as political rights are denied to them. Marriage is constituted by free consent, and is supposed to imply the approval of both parties. Now, that would be a hard bargain where one of the parties was offered all the terms of it in the lump, and was therefore obliged to take everything or reject the whole; yet all the incidents of marriage, all the terms of the contract, are fixed by the law, and the law is made by men. In constituting the relation of marriage—a relation of even greater importance to women than to men—women have no voice; they have only a barren and impracticable veto. In relation to the wife's right of holding and controlling property, etc., the agitation on the question of women's rights has wrought a great and beneficent change in the laws during recent years—removing nearly all the ground for the former just complaints.

2. *The Industrial Rights of Women.*—These comprise admissibility to all offices, occupations, and professions; also

admission to the universities, or some adequate provision for such education of women as may fit them for high posts. This raises the question of the proper sphere of women. The prevailing ideas point to marriage as the true if not the sole end of a woman's existence; but this theory is plainly inadequate to meet our social difficulties. Many women are unmarried: what is to be done with them? To hinder them from doing the best that they can for themselves would be a manifest injustice; therefore, in the interest of single women, all occupations should be open. But the claims on behalf of women do not stop there. It is denied that men have any right to exclude women from active life, and so drive them into marriage as their only livelihood. On grounds of justice, the right of women to enter into industry is conceived as almost too clear for argument.

The objections to the Industrial Rights of Women must be noticed briefly. It is said that the proper sphere of woman is domestic life, and that she is by nature unfit for the struggles of industry. Though the number of women engaged in industry is great, they are confined to poorly paid occupations, and their labor is mostly unskilled. Generally speaking, women of the middle class take no part in industry. The real issue is therefore narrow. It is not, Shall women be admitted to industry? for that is settled; but, Shall skilled and educated female labor—labor of high grade and commanding high wages—be allowed? There is no evidence that women have no capacity except for the meanest employments. What they are fit for can be finally determined only by actual trial. All that the advocates of women's rights ask is, do not anticipate the result, or foreclose the experiment. Some think that, while it is desirable that women should not be left unoccupied, they should not be admitted to industrial occupations, but society should seek a field for unmarried women in some works of charity or religion, or in some semi-domestic pursuit. This proposal looks toward the general establishment of that provision for unmarried women that is supplied by the monastic system in the Rom. Cath. Church. The objection to it is clear. If this semi-domestic pursuit is the most agreeable and lucrative to women, they will hail the discovery of it with gladness; but if it is not, they may decidedly object to make martyrs of themselves.

A common objection is that to take women from domestic work would harden them, and destroy the peculiar traits of their character. But a great part of what was formerly the work of the household has passed to another province; spinning, weaving, brewing, and baking were at one time domestic work. Those who believe that the peculiar attributes of women are an artificial product of civilization may feel alarmed at any disturbance of the present condition. But the genuine distinctions between the sexes flow from organization, and will not be obliterated by similarity of education and employment; on the contrary, no feminine charm would be lost, but women



## WOMEN'S RIGHTS.

would be more spirited, more intelligent, and fitter companions for men.

The argument is sometimes advanced that an admission of women to industry would be prejudicial to men, because it would increase the supply of labor, and thereby lower the rate of wages. This objection is founded on the principle that, when the wage-fund is constant, the rate of wages falls as the laborers are more numerous, and rises as they become less numerous. But the competition of women is, to some extent, an exception, for if they do not work for themselves, they must be supported out of the wages of men. If, however, wages were to fall below the ordinary standard of comfort, the tendency would be, by fewer births or by emigration, to reduce the excess of laborers, till the supply of labor should become adjusted to the required standard of wages; and experience shows that wages are not permanently lowered by admission of women to industry. It is asserted that, in the working class, wages adjust themselves to a scale enabling a working-man to maintain a wife and family.

In the last place, it is said that active life is inconsistent with the cares of maternity. This, of course, has no application to the large class of childless women; and there can be no necessity for prohibiting women from entering into industrial life, if their condition renders it impracticable. The incompatibility between active life and maternity may safely be left to take care of itself. It is, however, a question how far maternity interposes a barrier to the industrial education and employment of women. In the working class, the mother usually nurses her children, for she could seldom make a profit by engaging in another employment and hiring a servant; but if women were employed in skilled and well-paid occupations, they would probably leave nursing, which at present is unskilled labor, to servants. The solution of this problem must, however, be left to trial and experience. One principle, at any rate, is clear: except so far as women are occupied as mothers, they should be employed in the most remunerative work. That would be beneficial to men, for it would relieve them of a pecuniary burden; it would be beneficial to women, for it would make them independent.

The women of what may be called the middle class, led astray by a mistaken aspiration to aristocratic leisure, have held aloof from the struggles and rewards of industry: this has operated injuriously in various ways. It creates an unnatural competition with working-women, as in needle-work. Middle-class women often discharge duties that might better be left to upper servants. If they entered into commerce and trade, they would fit themselves for, and require, a higher kind of occupation than those thankfully accepted by poor and untaught women. The higher walks of business, and even subordinate offices of trust and skill, have long been monopolized by men; hence women engaged in the lower employments have derived little pecuniary benefit from their trustworthiness, experience, or judgment, and have had no hope of rising,

Any attempt to better their condition has met no encouragement or support. Such exclusion of women of the middle class from industry is hurtful to themselves: it often leads to poverty of the bitterest kind—the poverty of those delicately reared and well bred. It leaves them without occupation, a prey to *ennui* and bad health. It also forbids perfect companionship and sympathy between the sexes. The whole scope of a man's education is toward industry: in it he lives and moves. But of this world, women excluded from industry have no direct knowledge; hence a lack of intellectual sympathy between men and women, and an absence of any common standard of judgment. Nor is this all. The virtues on which industrial and public life repose do not derive due support from women. They are ignorant of the difficulties that beset moral problems under circumstances of which they have no experience, and their moral wisdom can hardly go beyond the traditionary and the conventional. Indeed, their influence is sometimes on the wrong side: a man will be reluctant to injure his family in their pecuniary interests, for some point of conscience with which his wife does not sympathize, though it is clear in his view, or for objects that she does not understand. The present generation, however, has seen the beginnings of a very decided change in the relation of women to business and industry. In this department new standards have at least been brought into public consideration, though not yet distinctly adopted. It is stated that nearly two hundred occupations are now open to women. Some employments, at first in the hands of men, have passed almost entirely to women, such as stenography and type-writing in offices.

No account of women's rights would be complete without some notice of the claim to equality in marriage. This is the goal to which history points. 'Among tribes which are still in a primitive condition, women were and are the slaves of men for purposes of toil. All the hard bodily labor devolves on them. In a state somewhat more advanced, as in Asia, women were and are the slaves of men for purposes of sensuality. In Europe there early succeeded a third and milder dominion, secured, not by blows, nor by locks and bars, but by sedulous inculcation on the mind: feelings also of kindness, and ideas of duty, such as a superior owes to inferiors under his protection, became more and more involved in the relation. But it did not for many ages become a relation of companionship.' That stage has now been attained, and, 'for the first time in the world, men and women are really companions.' Women cannot be good companions for men unless they are equals. If they are kept inferior in education and knowledge, their influence will tend to drag men down to their own level. The intercourse, moreover, that is of value is not intercourse between an active and a passive mind, but between two active minds. The theory of the subordination of women involves several bad consequences; for women, being un-



## WOMEN'S RIGHTS.

able to attain their ends directly, are tempted to have recourse to management and artifice.

The general movement of society is from subordination to equality. Under the feudal system, society was constituted on the principle of subordination: the land was tilled by serfs, and there were few but said that serfdom was the natural position of a creature so low as an agricultural laborer. But serfdom did not endure, and we have learned that it is happier for all parties that the land should be tilled by freemen. And now, too, negro slavery, the most plausible form of slavery, has been abolished. The tendency of social changes is toward equality, as the most satisfactory relation between man and man; it seems to point to equality as the highest relation also between man and woman.

In the United States, full suffrage is granted to women on the same terms with men in the four states of Wyo., Colo., Utah, and Ida. Wyo. was the pioneer in granting to women full suffrage 1869; the constitutional convention of 1889 approved it unanimously, and under that constitution Wyo. became a state 1890. Colo. gave the suffrage to women by legislative enactment 1893. In 1897 in Denver the women's vote turned the scale against the gambling and saloon element which had so long been in control there. In the period between 1893 and 97, five women have been elected to the legislature. In Utah the territorial constitution of 1884 gave woman suffrage: this privilege was annulled by the Edmunds law 1887, but restored by the constitution under which Utah was admitted as a state 1890; one woman was elected to the state senate at the election of 1896. Idaho adopted woman suffrage by constitutional amendment 1896, Nov. Kansas, by legislative enactment 1887, granted municipal suffrage to women, since which time 14 women have been elected mayors of small cities, and in very many cases members of city councils. Outside of the cities Kansas women can vote only on school appropriations and certain other matters. Limited suffrage, chiefly on school matters, is allowed to women in the states of Conn., Del., Ill., Io., Kan., Ky., Mass., Mich., Minn., Mont., Neb., N. H., N. J., N. Y., N. D., O., Or., S. D., Vt., Wash., Wis., and in the territories of Ariz. and Okla. In Wash. women voted by territorial law until forbidden by the territorial supreme court; the question came up in adopting the state constitution, men only having the right to vote on it, and the provision failed of being carried. In congress a select senate committee 1889, and the judiciary committee 1890, reported in favor of a constitutional amendment to relieve women in this country of disfranchisement; but no action was taken on these reports. Section 1 of the XIVth Amendment reads: 'All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the state wherein they reside. No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States.' In Section 2 the denial of right to vote

to male citizens is mentioned only as affecting ratio of representation. In the original constitution, Art. I., Sec. 1, the words are: 'The house of representatives shall be composed of members chosen every second year by the people of the several states.' It is claimed, however, that the constitution does not confer right to vote.

In Canada municipal suffrage is universally open to women, and in Ontario the only abridgment is in respect to the election of members of the legislature and parliament. In England, Scotland, and Wales the status is much the same as in Ontario. In Ireland women can vote for city officers in Belfast, for harbor boards in seaports, and for poor-law guardians in all places. In France female teachers can vote on members of councils of instruction. In Sweden women suffrage is directly or indirectly almost unlimited; and in Russia also, except that it is confined to heads of households; likewise in Austria-Hungary, except that it is by proxy. In Italy widows may vote for members of parliament. Municipal suffrage is extended to women in Cape Colony, in Australia, and New Zealand; in the last, as well as in S. Australia, the privilege includes parliament elections. Women suffrage, restricted or not, exists in many islands, and (in all the world) over an area greater than that of Asia, and among populations greater than those of the whole of Europe.

The constitution of N. J., framed 1776, made no restriction of sex in suffrage, and an act passed 1793, repealed 1807, expressly recognized both sexes. The first woman's-rights convention was at Seneca Falls, N. Y., 1848, July 19; the first national convention at Worcester, Mass., 1850, Oct. 23; and the first petition on the subject was presented to congress 1866. Two years later the New England assoc. was organized, and began systematic work. Mrs. Elizabeth Cady Stanton, Lucy Stone, Mary A. Livermore, and others, were among prominent movers from the first. State and national political conventions, whether sincerely or not, have indorsed the movement. The first favorable European legislation was, by a happy contrariety of name, in the Isle of Man 1881, property being the only qualification. The Brit. parliament gave the municipal privilege in England and Wales 1869; in Scotland to single women 1881; and to all rate-payers the school suffrage 1870.

Women's rights are discussed in the following: *Dissertations and Discussions*, by J. S. Mill, II., *Enfranchisement of Women*; *The Political and Social Dependence of Women* (1867); *The Industrial and Social Position of Women* (1857); Speech by J. S. Mill in house of commons, 1867, May 21; the *Westminster Review*, 1867, 75, 80; Prof. Cairnes in *Macmillan's Magazine*, 1874; *Harper's Monthly*, 1880; and *Freedom's Conquests, the Great Spread of Woman Suffrage through the World*, by Hamilton Willcox, chairman of the N. Y. exec. committee of the woman suffrage party.

WON, v. *wūn*: the pt. and pp. of WIN (q.v.).

WON, v. *wūn* [AS. *wunian*, to dwell (see WONT)]: in *OE.*, to dwell; to live: N. in *OE.*, a dwelling; a habitation. WON'NING, imp. WONNED, pp. *wūnd*.



## WONDER—WOO-CHANG.

**WONDER**, n. *wŭn'dēr* [AS. *wundor*; Dut. *wonder*, a wonder: Icel. *undra*; AS. *wundrian*; OHG. *wunteron*; Ger. *wundern*, to wonder]: surprise caused by something new, strange, or unexpected, which at the moment appears inexplicable; a word which expresses less emotion than *astonishment*, and greatly less than *amazement*; a thing which excites surprise; a strange thing; a prodigy; a miracle: V. to be struck with surprise or slight astonishment; to feel doubt and curiosity, as, 'I *wonder* whether he will be in time.' **WON'DERING**, imp.: **ADJ.** indulging or feeling wonder. **WON'DERED**, pp. *-dērd*. **WON'DERER**, n. *-dēr-ēr*, one who wonders. **WON'DERFUL**, a. *-fŭl*, adapted to excite wonder or admiration; exciting surprise; astonishing; marvellous; surprising; remarkable. **WON'DERFULLY**, ad. *-lī*, in a manner to excite wonder or surprise. **WON'DERFULNESS**, n. *-nēs*, the state or quality of being wonderful. **WON'DERINGLY**, ad. *-lī*. **WON'DERMENT**, n. *-mēnt*, surprise; astonishment. **WON'DROUS**, a. *-drŭs*, of a kind or degree to excite surprise and astonishment; strange; marvelous. **WON'DROUSLY**, ad. *-lī*, in a strange manner; to a strange degree. **WON'DROUSNESS**, n. *-nēs*, the quality of being wondrous. **WON'DER-STRUCK**, a. struck with wonder or surprise. **WON'DER-WORKING**, a accomplishing wonders.

**WONGSHY**, or **WONGSKY**, n.: erroneous forms of **WONG-CHI**, *wŏng-chē* or **HWANG-CHI**, *hwŏng-*, Chinese name for the seeds of the plants *Gardenia floribunda* and *G. radicans*, which yield a yellow dye. The aqueous solution of wong-chi colors wool and silk without mordants; cotton must first be mordanted with a solution of tin. When roasted the seeds of the *chi* are called *Hēh*, or black chi, and are exhibited in fevers. [The name *Wong-chi* is from *hwang*, yellow, and *chi*, a plant of the genus *Gardenia*.]

**WON'T**, *wŏnt*: contraction of *will not*, an obsolete form of *will not*.

**WONT**, n. *wŏnt* [AS. *wunian*; Ger. *wohnen*, to dwell, continue in: Icel. *vani*, custom, use: OHG. *giwona*, usage]: custom; use; habit: **ADJ.** used or accustomed: V. in *OE.*, to be accustomed. **WONTED**, a. accustomed; usual. **WONT'EDNESS**, n. *-nēs*, the state of being wonted. **WONT'LESS**, a. unaccustomed; unusual.

**WOO**, v. *wó* [AS. *wogian*, to woo—from AS. *woh*, bent—*lit.*, to bend, to incline]: to make love to; to court; to seek, as a wife; to invite with importunity. **WOO'ING**, imp. **WOO'INGLY**, ad. *-lī*. **WOOD**, pp. *wód*. **WOOR**, n. *wó'ēr*, one who woos; one who seeks to gain the favor or love of a woman with a view to marriage; a suitor.

**WOO-CHANG**, *wó-cháng'*: city of China, prov. of Hoo-pe, and the seat of the viceroy of Hoo-nan and Hoo-pe; on the Yang-tse-kiang river, at the influx of the Han-kiang, and nearly opposite the great river-port of Hankow (q.v.); 600 m. w. of Shanghai, and about 350 m. s.w. of Nanking. W. is a fine walled city, noted for its learning, and for its manufactures in metals.—Pop. not definitely known, but less than one million.

WOOD, n. *wúd* [AS. *wudu*; Dan. and Sw. *ved*, wood; W. *gwydd*, trees, shrubs; Gael. *fiodh*, timber]: a large collection of growing trees; the solid fibrous part of a tree lying below the bark (see WOOD and WOOD & FIBRE, below); trees fit for use in building, etc., either standing or cut down and cut into pieces suitable for various purposes; timber: ADJ. pertaining to a wood or woods; made of wood: V. to supply with growing trees or wood; to be supplied with wood. WOOD'ING, imp. WOOD'ED, pp.: ADJ. supplied or covered with wood or growing trees. WOODEN, a. *wúd'n*, made of wood; consisting of or resembling wood; clumsy; senseless; awkward. WOOD'Y, a. -*ī*, abounding with wood or trees; resembling wood; of the nature of wood; ligneous. WOOD'INESS, n. -*nēs*, the state or quality of being woody. WOOD'LAND, n. land on which trees are allowed to grow: ADJ. relating to woods. WOOD'LESS, a. -*lēs*, having no woods or large collections of trees. WOOD'-BINE, n. -*bīn*, or WOOD'BIND, n. -*bīnd* [*wood*, and *bind*]: the Honeysuckle (q.v.)—so called because it binds or encircles like a band; the *Caprifolium periclymenum*, ord. *Caprifoliacēæ*; also, in the *United States*, the Virginia creeper, *Ampelopsis quinquefolia* (see VITACEÆ). WOOD'-COAL, lignite or brown-coal, in allusion to its woody texture, which is often as distinct and well preserved as in recent timber. WOOD'-CUT, an engraving on wood; a print or impression from such an engraving. WOOD'-CUTTER, one who fells trees or who cuts wood; an engraver on wood. WOOD'-CUTTING, the art or employment of cutting wood by saws, etc.; wood-engraving. WOOD'-ENGRAVER, one who engraves on wood. WOOD'-ENGRAVING, the art of cutting designs in relief on wood, so that impressions on paper or some similar material can be made from them in a printing-press (see below); an engraving on wood. WOOD'-FRETTER, n. *frēt'tēr* [*wood*, and *fret*]: an insect that burrows in wood. WOOD'-LARK, a species of lark found near the borders of woods; *Alauda arborea*. WOOD'-LOUSE, a flattish crustacean of a slate-color, having many feet, inhabiting cellars, gardens, old walls, and moist places; an *oniscus* (see below); the familiar name of a small white insect found in decaying wood; also called a *wood-mite*. WOOD'MAN, one who fells trees; a forester; in *OE.*, a huntsman. WOOD'-MEASURER, in *Scotland*, a lumber-merchant. WOOD'-MERCHANT, a lumber-merchant; one who sells fire-wood. WOOD'-MITE: see WOOD-LOUSE. WOOD'-NOTE, wild music; the music of forest birds. WOOD'-NYMPH, in *anc. myth.*, a goddess of the woods. WOOD'-OPAL, a variety of opal, or opalized wood, in which the form and texture of the wood are still distinctly visible. WOOD'-PAVEMENT, a pavement consisting of blocks of wood instead of stones. WOOD'-PIGEON, the ring-dove, which frequents the woods; also, in the *United States*, the band-tailed pigeon, *Columba fasciata* (see PIGEON). WOOD'SARE, n. -*sār*, matter like saliva or froth found on herbs, being a mere investment or covering for the larvæ of the frog-hoppers; now popularly called cuckoo-spit. WOOD'-SORREL, a common plant, having an acid taste; the *Oxalis acētōsel'la*, ord. *Oxalidacēæ* (see OXALIDÆÆ), which, it is claimed, is



the true shamrock rather than the trefoils. WOOD'-SPIRIT, impure methyl alcohol; pyroxylic acid. WOOD'STONE, a common term for silicified wood. WOOD'-TIN, a variety of tin ore—so called from its fibrous texture resembling that of wood—usually of a brown or yellowish-gray color. WOOD'-WARD, in *OE.*, a forester; a warden of woods. WOOD'-WORK, that part of a structure which is made of wood. WOODEN LEG, a stump or support made for a person as a substitute for a lost leg; an artificial leg made of wood. WOODEN SHOE, a shoe shaped out of wood; a sabot. WOODEN SPOON, a spoon made of wood; the name given to the last of the junior optimes in mathematical tripos at Cambridge University, England; at Yale University, the most popular student of the class. WOODEN-WARE, a general name for buckets, bowls, and other articles of domestic use made of wood. IN THE WOOD, applied to wine in casks.

WOOD, a. *wûd* [*AS.* *wód*; *Goth.* *vods*, mad, possessed; *Ger.* *wuth*; *Dut.* *woede*, madness]: in *OE.*, mad; raging; furious. WOOD'LY, ad. *-lŷ*. WOOD'NESS, n. in *OE.*, anger; rage; madness.

WOOD, ALPHONSO: botanist: 1810, Sep. 17—1881, Jan. 4; b. Chesterfield, N. H. He graduated at Dartmouth Coll. 1834, studied divinity at Andover Theol. Sem. the next year, was a teacher at Kimball Union Acad., Meriden, N. H., 1836-49, practiced civil engineering 1849-51, was pres. of the Ohio Female Seminary 1851-57, and after filling for some time a chair in Terre Haute Female College, Ind., he was principal of Clinton Female Seminary, Brooklyn, N. Y., until 1865. He spent 1866 in travel, and settled, 1867, at West Farms, N. Y. His publications included *Class-book of Botany* (1845); *New Class-book of Botany* (1861); *First Lessons in Botany* (1848); *Leaves and Flowers* (1863); *The American Botanist and Florist* (1870); *The Illustrated Plant Record and Guide to Analysis* (1876); and *Fourteen Weeks in Botany* (1879).

WOOD, ANTHONY: English antiquary: 1632, Dec. 17—1695, Nov. 28; b. Oxford. In 1647 he was entered at Merton College as a gentleman commoner, 1652 took his degree as bachelor, 1655 became M.A. Deriving from his father an independence, he seems at first to have aimed at being a sort of jack-of-all-trades. Dugdale's *Antiquities of Warwickshire* influenced him to assiduous antiquarian study; and he pub. 1669 his *History and Antiquities of Oxford* (Latin transl. 1674). His *Athene Oxonienses* (1691) contained a full account of all the authors, bishops, etc., who had adorned that univ. 1500-1690. In this work he attacked the character of the great Lord Clarendon, for which he was prosecuted at the court of the univ., and expelled. His books and some MSS. he left to the university.

WOOD, ELLEN (PRICE); known as Mrs. HENRY WOOD: English novelist: 1814, Jan. 17—1887, Feb. 10; daughter of a glove-manufacturer in Worcester, England. She was married at an early age to the head of a shipping and banking firm established in France; and was a contributor for many years to several magazines. She made her first great success with *East Lynne* (1861), which not only attained universal popularity, but was praised by the London *Times* and leading critics as of high rank among the novels of the century. There rapidly followed from her pen *The Channings*, and *Mrs. Halliburton's Troubles* (1862); *Verner's Pride*, and *The Shadow of Ashlydyat* (1863)—the second of these her best work; *Lord Oakburn's Daughters*, *Oswald Cray*, and *Trevlyn Hold* (1864)—all the six of the same high quality as *East Lynne*. From *Mildred Arkell* (1865), through the 20 years, from 1867, that her stories were the mainstay of the *Argosy* magazine, her popularity continued, with less to satisfy exacting criticism, owing to the haste, repetition, and commonplace sentiment and material which found place in her work.

WOOD, FERNANDO: politician: 1812, June 14—1881, Feb. 14; b. Philadelphia, Penn.; of Quaker descent. A resident of New York from 1820, and early engaged in business as a shipping merchant, he was from 1833 active with pen and voice in democratic politics, and served as member of congress 1841, May 31—1843, Mar. 3. Defeated in 1850 in city election for mayor, he succeeded in 1854, and undertook reforms which secured him re-election in 1856. On the passage of a bill abolishing the municipal police, and creating the metropolitan, not under the mayor's control, he endeavored to resist the change, and at the next election was defeated. Again elected 1859, he advised, 1861, Jan., in sympathy with the secession of the southern states, that the city secede and become a sovereign free city. He obtained an election to congress, serving 1863, Dec. 7—1865, Mar. 3; and again, after a year in Europe, was in congress 1867, Mar. 4—1877, Mar. 3.

WOOD, GEORGE, LL.D.: lawyer: 1789, Jan. 17—1860, Mar. 17; b. Chesterfield, N. J. He graduated at Princeton 1808, studied law under Richard Stockton, and began practice in New Brunswick, where he attained the highest rank in his profession for clearness of statement and power of reasoning. His arguments on cases of charitable bequests, in particular, accomplished much in clearing up the law and in shaping subsequent decisions. Removing to New York 1831, he was employed in many important litigations, and was in request in other states. At the same time he interested himself in the principles of our government and the elucidation of constitutional questions. It is related that an opposing lawyer in a case before the U. S. supreme court spoke of him to Daniel Webster as 'a sleepy-looking fellow named Wood.' 'If it is George Wood,' was the reply, 'I advise you to look out how you wake him up.'—He died in New York.



WOOD, GEORGE BACON, M.D.: medical professor and author: 1797, Mar. 13—1879, Mar. 30; b. Greenwich, Cumberland co., N. J. He was at school in New York, was graduated at the Univ. of Penn. 1815, in medicine 1818; and 1820 began to lecture on chemistry. He was prof. of chemistry in the Philadelphia Coll. of Pharmacy 1822–31, of materia medica 1831–35, of the same in the Univ. of Pennsylvania 1835–50, and had the univ. chair of the theory and practice of medicine 1850–60. He was physician in the Penn. Hospital 1835–59, was pres. for many years of the College of Physicians of Philadelphia, and became pres. of the Amer. Philos. Soc. 1859. In 1865 he endowed in the Univ. of Pennsylvania an auxiliary faculty of medicine, embracing chairs of zoology and comparative anatomy, of botany, of mineralogy and geology, of hygiene, and of medical jurisprudence and toxicology. He published *The Dispensatory of the U. S.* (in conjunction with Franklin Bache, 1833); *A Treatise on the Practice of Medicine* (1847); *A Treatise on Therapeutics and Pharmacology* (1856); *Lectures and Addresses on Medical Subjects* (1859). He also prepared a *Hist. of the Univ. of Pennsylvania* (1827); *Memoir of Samuel G. Morton* (1853); and *Memoirs of Franklin Bache* (1865).

WOOD, JAMES: soldier and gov. of Va.: 1750—1813, July 16; b. Olney, near Richmond; son of Col. James W., founder of Winchester, Va. He received a commission as capt. of state troops from Lord Dunmore 1774, and was elected to the house of burgesses from Frederick co. 1775. He went on a mission to the Indians of the west, to invite them to a treaty at Fort Pitt, 1775, July, and by great courage and judgment achieved success. The house of burgesses, in which he was serving, appointed him, 1776, Nov. 12, col. commanding the 8th Va. regiment of the line. He was in command at Charlottesville, Va., 1778, in charge of Burgoyne's captured army; was supt. of all the prisoners of war in Va. 1781; was commissioned brig.-gen. 1781; was on the state council several years, and as senior member was lieut. gov.; was presidential elector 1789; and was elected gov. 1796, Dec. 1—1799, Dec. 1. He served as pres. of the Soc. of the Cincinnati 1802–13. He was vice-pres. 1797, and pres. 1801, of an abolition society.

WOOD, JAMES FREDERIC, D.D.: first Rom. Cath. archbishop of Philadelphia: 1813, Apr. 27—1883, June 20; b. Philadelphia; of English parentage. His childhood was spent partly with relatives in England, where he attended school. In 1828 he became bank-clerk in Cincinnati, and was cashier 1833–36; joined the Rom. Cath. Church; went to Rome to study for the priesthood in the College of the Propaganda, remaining 7 years; was ordained, and officiated as asst. rector of the Cincinnati cathedral until 1854, when he became pastor of St. Patrick's. He was made bp. of Gratianopolis 1857; transferred to Philadelphia as coadjutor of Bp. Neumann, whom he succeeded 1860. In 1869 he was a mem. of the Vatican Council. The great prosperity of his diocese under his administra-

tion led to its subdivision, and he was made abp. 1875. He founded or promoted many institutions of learning and charity connected with his church, and his wise management brought the cathedral to completion 1864. He died in Philadelphia.

WOOD, JAMES RUSHMORE, M.D.: surgeon: 1816, Sep. 14—1882, May 4; b. Mamaroneck, N. Y. He graduated at Castleton Med. Coll., Vt., 1834; was demonstrator of anatomy there; removed to New York; effected a reform of Bellevue Hospital, reducing the death-rate 600; began Saturday clinics; collected the best anatomical museum in this country, and gave it to the city 1856; founded the Wood anatomical prize, and, with others, the Bellevue Hospital Med. College, in which he was prof. of surgery and surgical pathology until his death. He achieved the reproduction of bones in the living body by separating the periosteum from diseased bone; removing this; and he performed other novel and successful operations. He was surgeon also in other institutions, and pres. of the Pathological Soc. Besides his valuable surgical papers written for the medical journals, he published an essay on *Medical Education* (1848).

WOOD, JOHN: soldier and public official: 1798, Dec. 20—1880, June 4; b. Moravia, N. Y. When he became of age he emigrated to Ill., and built the first house on the site of Quincy 1822, of which city he was the most prominent citizen and a frequent official. He was a member of the state senate 1850-54; lieut. gov. 1856, and gov. 1859. At the opening of the civil war he was appointed quartermaster-gen. of the state; attended the peace conference at Washington 1861; was col. of an Ill. regt. 1864, and commanded a brigade at Memphis when Gen. Forrest captured that city the same year. Afterward, as quartermaster-gen. of his state, he was busy at home and in the southern field. In the early history of Ill. he was foremost in securing the state to freedom, against the efforts of pro-slavery men. He died in Quincy, where a monument to his memory was erected 1883.

WOOD, JOHN GEORGE: English author of books on natural history: 1827—1889, Mar. 4; b. London; son of a surgeon. He graduated B.A. at Oxford 1848; was two years connected with the anat. museum there; ordained in the Church of England 1852, and had charge of the boatmen's floating chapel; asst. chaplain of St. Bartholomew's Hospital 1856-62; and precentor of Canterbury Diocesan Choral Union 1868-76. He visited the United States and lectured 1882-3, and again 1884. His works on natural history are exceedingly numerous, and are of a popular character, instructive and entertaining, many of them illustrated by the best artists. They are mostly zoological, pertaining to England, and not a few of them for young readers. The first, *Natural Hist.* (1852), had 450 illustrations by William Hervey. His other chief works were: *Illustrated Natural Hist.* (3 vols. 1859-63), with 1,500



## WOOD.

engravings; *Homes Without Hands* (1864); *Natural Hist. of Man* (1868-70); and *Man and Beast, Here and Hereafter* (1874).

WOOD, LEONARD: soldier; b. in Winchester, N. H., 1860, Oct. 9. He was graduated at the Harvard Medical School 1884; appointed 1st lieutenant and assistant surgeon in the regular army 1886; served under Gen. Miles in the operations against the Apache Indians; and afterward was physician at the White House. At the outbreak of the war with Spain (1898) he became colonel of a volunteer regiment of cavalry known as the "Rough Riders;" promoted brigadier-general U. S. V. July 8 following, for gallant service at the battles of Las Guasimas and San Juan Hill, and major-general U. S. V. Dec. 8 of the same year. On 1898, July 20, he was made military governor of the city of Santiago, and later of both city and province. On 1899, Dec. 5, he was appointed brigadier-general U. S. A., and Dec. 13 following succeeded Gen. Brooke as Governor-General of Cuba; and in 1903 was promoted major-general U. S. A., and assigned to milit. dept. of Mindanao, Philippine Islands.

WOOD, THOMAS JOHN: soldier: b. Munfordville, Ky., 1823, Sep. 25. He graduated at West Point 1845; served in the topographical corps and in the dragoons: participated in the principal battles of the Mexican war, and was promoted for gallantry at Buena Vista; was on the staff of Gen. Harney 1848-9; rose in the service to capt.; was on duty in Kan. during the troubles of 1856-58, and in Utah the following year. Promoted lieut.col. 1861, and made brig.gen. of vols., he had command of a division in the operations preceding and following the battle of Shiloh 1862, and was wounded at Stone River the last day of that year. The next year he was in the movements connected with the actions of Chickamauga and Mission Ridge, the relief of Knoxville, and the invasion of Ga.; and was in the battles of Franklin and Nashville, 1864, Nov. and Dec., commanding the 4th corps, though wounded severely at Lovejoy's Station in the preceding Sep. He was commissioned maj.gen. of vols. 1865, and commanded departments of the southwest. For distinguished service at Chickamauga he was brevetted brig.gen. in the regular army, and maj.gen. after the battle of Nashville. He retired from service 1871.

WOOD. THOMAS WATERMAN: artist: b. Montpelier, Vt., 1823. He was pres. of the National Acad. of Design 1890-1900, succeeding Daniel Huntington, resigned. After studying with Chester Harding in Boston, and in Europe, he spent several years in Ky.; opened a studio in New York 1867, and was elected academician 1871, pres. of the Water-color Soc. 1878-87, vice-pres. of the National Acad. 1879-90. He is a member of the Etching Club, and of a similar Brit. soc. Besides portraits, water-colors, and etchings, he excels in *genre* subjects, full of character and color.

## WOOD—WOODBIDGE.

WOOD, WALTER ABBOTT: inventor: b. 1815, Oct. 23, in Mason, N. H.; son of Aaron W., an early maker of the cast-iron plows invented by Jethro W. He worked until the age of 20 in his father's shops; settled at Hoosic Falls, N. Y., 1835. Later in business for himself, and making a study of farming machines, he took hold of Manny's reaper with his own improvements 1852, and, continuing to improve and invent, rapidly developed a very large business in reapers and mowers. He took out about 30 patents, created the largest works of the kind in the world, obtained the highest recognition at Paris 1867, Vienna 1873, Philadelphia 1876, and Paris again 1878; and secured 80 to 90 per cent. of the foreign trade. It is computed that more than 600,000 machines in all were made by him. The concern was made a stock co. 1866, with W. as pres. He was in congress as a republican 1879, Mar. 18—1883, Mar. 4. He d. 1892, Jan. 15.

WOOD, WILLIAM: colonist: 1580-1639; b. in England. He came to New England 1629, returned to England 1633, came very soon again to New England and settled at Lynn for three years, was its representative in the Mass. general court 1636, and the next year settled in Sandwich. While in London he published *New England's Prospect, A True, Lively, and Experimental Description of that part of America commonly called New England* (1634). It was the earliest account of Massachusetts, and had a curious map of the country. It was republished 1764, and again 1865.

WOOD, WILLIAM MAXWELL, M.D.: surgeon: 1809, May 27—1880, Mar. 1; b. Baltimore. He entered the navy as asst. surgeon 1829, became passed asst. 1835, was commissioned surgeon 1838, served on the coast of Fla. in the Seminole war 1838-41, was made fleet-surgeon of the Pacific squadron 1843, obtained for Com. Sloat the first news of the Mexican war, and thus led to the operations which resulted in the conquest of California. He served as fleet-surgeon of the E. India squadron 1856-58, and of the n. Atlantic blockading squadron 1861-65; and was surgeon-gen. of the navy and chief of the bureau of medicine and surgery 1869, July 1—1871, May 27, when he reached the legal age of retirement.—He published *Wandering Sketches* (1849); *A Shoulder to the Wheel of Progress* (1849); *Hints to the People on the Profession of Medicine* (1852); and *Fankwei* (1859). He held a commission as medical director from 1871, Mar. 3, and resided at Owing's Mills, Md.

WOODBIDGE, *wúd'brīj*: village and tp. in Middlesex co., N. J.; on Staten Island Sound and Woodbridge creek, and on the Pennsylvania railroad; 5 m. s. of Rahway; 24 m. s.w. of New York, with which it has regular steamboat-communication. It has 6 churches, graded schools, public library, 1 weekly newspaper, large trade in fire-clay, and important manufactures of fire-clay articles, including brick and tile. Pop. (1890) 4,665; (1900) 7,631.





Life-sized Portrait Statue from Egyptian Tomb. (About B.C. 4000.)



Part of a Carved Architrave of a Door, from Church in Aal, Norway. (12th century.)

## WOODBIDGE—WOODBURY.

**WOOD'BRIDGE:** market-town and port of Suffolk, Eng.; on the right bank of the Deben, which here expands into an estuary; 11 m. from the sea, 8 m. e.n.e. of Ipswich. Vessels of 120 tons can reach the town. There are a custom-house, a bonding warehouse, and docks for ship-building. The church is a striking edifice of black flint and freestone with magnificent tower. There is also a richly endowed charity which supports an excellent and well-conducted grammar school, commodious almshouses, a public dispensary and library. Corn, flour, and malt are exported.—Pop. 5,000.

**WOODBIDGE, wú'd'brīj, JOHN:** New England colonist and Congl. minister: 1614–1691, July 1; b. Stanton, Wiltshire, England. He was at Oxford Univ. until the requirement for ecclesiastical conformity caused his withdrawal to private study; he came to New England 1634, and settled at Newbury, Mass.; was town-clerk 1634–38; married a daughter of Gov. Thomas Dudley 1639; taught in Boston 1643; was one of the original purchasers of the land of Andover, Mass.; and became the first minister of the church there, ordained 1645, Oct. 24. He went back to England 1647; was chaplain with the commission which made a treaty with the king at the Isle of Wight; was minister at Andover, Hants, England, and in Wiltshire until ejected after the Restoration and on being driven from a school which he had started at Newbury, Eng., he returned to Mass., and became assistant to his uncle, the Rev. Thomas Parker, at Newbury, Mass., until 1670. The American Woodbridges are his descendants.

**WOOD'BRIDGE, WILLIAM:** lawyer and U. S. senator: 1780, Aug. 20—1861, Oct. 20; b. Norwich, Conn.; fifth in descent from the colonist John W. (q.v.). He removed with his father, Dudley (1747–1823), to Marietta, O.; was sent to school in Conn., and studied law at Litchfield; was admitted to the bar of Ohio 1806, and elected to the assembly 1807, and was in the state senate 1808–14. Pres. Madison made him sec. of the terr. of Mich. 1814, and he removed to Detroit, and later became the first delegate to congress from Mich. 1819–20. He was judge of the superior court of Mich. 1828–32, was in the constitutional convention 1835, member of the state senate 1837, gov. of Mich. 1840–1, and member of the U. S. senate 1841, May 31—1847, Mar. 3. He acted for a long time as legal adviser of John Jacob Astor, and was counsel in many important Canadian cases against the Hudson Bay Co.

**WOODBURY, wú'd'bér-ĩ:** city, cap. of Gloucester co., N. J.; at the head of navigation on Woodbury creek, and on the Delaware River and the West Jersey railroads; 8 m. s. of Philadelphia. It contains a court-house, city hall, jail, 9 churches, 4 public schools, acad., public library, opera-house, and 3 weekly newspapers; manufactures glass, lumber, flour and patent medicines; is a shipping-point for large quantities of berries, fruit, and vegetables; and is a popular place of residence for many people doing business in Philadelphia. Pop. (1890) 3,911; (1900) 4,087.



## WOODBURY—WOODBURY PROCESS.

WOODBURY, *wúd'bér-ĩ*, DANIEL PHINEAS: soldier: 1812, Dec. 16—1864, Aug. 15; b. New London, N. H. He graduated at the U. S. Milit. Acad. 1836, was promoted 2d lieut. in the artillery, then transferred to the engineers, and became 1st lieut. 1838, July. After service to 1840 in constructing the Cumberland road in O., he was on duty to 1847 in repair of works on the Atlantic coast, and as asst. in Washington. He had charge of construction at Fort Kearny and Fort Laramie till 1850, and on the N. C. coast to 1856. He became capt. of engineers 1853, major 1861, Aug. 6, lieut. col. Sep., brig. gen. of vols. 1862, Mar. 19. He assisted in constructing the defenses of Washington; rendered most valuable service in making roads, causeways, and bridges at Yorktown and in the advance on Richmond, and again at Fredericksburg in laying down pontoons, and in their prompt removal, under fire. He was in command at Key West from 1863, Mar., and died there of yellow fever.

WOODBURY, ISAAC BAKER: musical editor: 1819—1858, Oct. 26; b. Beverly, Mass. After a year's study of music in Europe, on his return to this country he taught music in the schools of Boston, until his removal to New York 1845, where he edited the *Musical Review*, and the *Musical Pioneer*. Among the compilations of church-music books and glee-books which he made were the *Anthem Dulcimer* (1850); *Liber Musicus* (1851); *Million's Glee-book* (1853); *Cultivation of the Voice without a Master*; *Self-Instructor in Musical Composition and Thorough Bass*; *Singing-School and Music-Teacher's Companion*, and *Melodeon and Seraphine Instruction-Book*.

WOODBURY, LEVI: statesman and jurist: 1789, Dec. 22—1851, Sep. 4; b. Francestown, N. H.; descendant of John W., colonist at Cape Ann 1624, and Salem (Naumkeag) 1626. He graduated at Dartmouth College 1809, studied law at Litchfield, Conn., and was admitted to the bar 1812; became clerk of the state senate 1816; was appointed judge of the state supreme court 1817, and removed to Portsmouth; became gov. of N. H. 1823—4; was speaker of the state lower house 1825; was U. S. senator 1825, Dec. 5—1831, Mar. 3; then sec. of the navy until 1834, sec. of the treasury until 1841, and again U. S. senator 1841, Mar. 4—1845, Nov. 25. He was a democrat in politics, and voted, 1844, for the annexation of Texas. Declining the mission to England 1845, he was appointed to succeed Judge Story as justice of the U. S. supreme court, and held the office from 1846, Jan. 3, to his death. Three volumes of *Writings, Political, Judicial, and Literary*, from his pen, were published 1852, after his death. It was under him that the independent U. S. treasury system was first established.

WOODBURY PROCESS: see POSITIVE PRINTING.

WOOD'-CARVING: probably the oldest branch of art. Apparently the first weapon was a club, and the first attempt at decoration was some scratching or carving on it. Among the Egyptians, Greeks, and Romans wood-carving was much practiced.

A very remarkable relic is a life-size portrait-statue in the Boulak museum, and supposed to date B.C. 4000; it is carved from a single block of sycamore, and, unlike much later Egyptian work, is so natural and realistic that it may well be compared with the most modern sculptures. Of nearly the same date, and in the same collection, are panels from the inner walls of a tomb, with figures in relief full of spirit and delicacy of execution. Other examples are the coarser work on mummy-cases, also articles of furniture or implements that exhibit more care and skill, especially in representing plants. The climate of Egypt has tended to preserve these remains of ancient art in wood, usually very perishable. The earliest Grecian carving in wood seems to have been rude images of the gods. The Palladium, a figure of Pallas, guarded by the vestals in Rome, was of wood, and fabled to have been rescued by Æneas from the burning of Troy. Other statues are described by Greek and Roman historians; also highly ornate coffers. A cedar box with carved dogs was found by Dr. Schliemann at Mycenæ. The colossal statue of Athene by Phidias is well known to have been mostly of wood.—Of Roman remains in this art, only later examples are of interest, e.g., the door-panels of the church S. Sabina in Rome, dating in the 5th c., each with a scene from the Old or the New Test. Beautiful examples of intricate relief-carving from old wooden churches in Denmark and Norway have been saved from the buildings, now mostly destroyed; they date from the 9th to the 13th c. No better work of the kind was ever done.

In England every church had its reredos, retable, and other interior church fixtures, usually of carved wood; but these, because including images, were destroyed at the Reformation. Other old English work is represented in the effigies on tombs, e.g., the 12th-c. figure of Robert of Normandy in Gloucester Cathedral, and the admirable one of a knight, George de Cantelupe, in the Abergavenny church, which has also the relic of a colossal statue of Jesse, once serving as root for a gigantic carved tree forming a screen behind the altar. Church stalls, screens, and roofs of great beauty were produced in England from the 15th to the early 16th c. The beauty of the wood itself, however, was not appreciated, being overlaid with elaborate gilding and painting, which, in the surviving examples, has been scraped off by modern taste. For illustrations of some of the finest remains, see *Bury's Eccles. Wood-work* (1847), and Brandon's *Open Timber Roofs* (1856); and, for less meritorious examples, Small's *Scottish Wood-work of the 16th and 17th c.* (1878), and Sanders's similar work (1883). Near the end of the 17th c., realistic imitation with poor decorative effect came into vogue, as seen, e.g., in Trinity College, both of Oxford and Cambridge, and at Chats-



worth.—In the middle ages, great Italian sculptors often carved crucifixes and statues of saints, a fine illustration of which is Nino Pisano's *Angel of the Annunciation*, now in the South Kensington Museum, London. Raphael made designs, of which his *Stanze*, in the Vatican, is an example; also the fine work in walnut at a church in Perugia. The same art flourished in Spain, France, and in Germany especially, where technical skill in the work has continued to the present time. The arabesques of the Mohammedan countries are famous; and the Hindu, Chinese, and Japanese work, of old and of the present, is wonderful.

The Centennial Exposition of 1876 gave an impulse to this art in the United States, already creating an interest by its practice in Cincinnati, where it was introduced by two Englishmen who had been employed on the houses of parliament. Benn Pitman did much to promote it, and it has for some years been a fashion among women of artistic inclination, as well as a frequent adjunct to educational institutions. The Cincinnati and other schools have searched successfully for models in our own flora and fauna. It should not be overlooked that a degree of native genius has often been applied to carving the figure-heads of ships, and even sometimes to the wooden images of tobacco-stores.—See Williams's *Hist. of the Art of Sculpture in Wood* (1835); Rogers's *Art of Wood-carving* (1867); Leland's *Minor Arts* (1880).

WOOD-CHARCOAL: most important, though not the purest, kind of charcoal. Wood consists of carbon, hydrogen, and oxygen, the last two being in the proportion to form water. When heated in the open air, it burns completely away, except a small white ash; but if the supply of air be limited, only the more volatile matters burn away, and most of the carbon remains. This is the principle of the process of charcoal-burning in countries where wood is abundant. A number of billets of wood are built up vertically in two or three rows into a large conical heap, which is covered over with turf or moistened charcoal-ash, holes being left at the bottom for the air to enter. A hollow space also is left in the middle of the heap, to serve as a flue for the gaseous matters which are evolved. The heap is set on fire by throwing burning pieces of wood into the central opening, near the top of which, however, a kind of grate, made of billets of wood, is placed to prevent the burning fuel from falling at once to the bottom. The combustion then proceeds gradually from the top to the bottom, and from the centre to the outside of the heap; and as the central portions burn away, fresh wood is continually thrown in at the top, so as to keep the heap quite full. The appearance of the smoke shows how the combustion is proceeding: when it is going on properly, the smoke is thick and white; if it becomes thin, and especially if a blue flame appears, it is a sign that the wood is burning away too fast, and the combustion must then be checked, by partially stopping up the holes at the bottom, or by heaping fresh ashes on the top and sides, and pressing them down well, so as to diminish the draught. As





The Centre of a Wooden Triptych, attributed to Veit Stoss, now in the South Kensington Museum.



Traceried Panel of Oak. (French work of 15th century.)



## WOOD-CHARCOAL.

soon as the combustion is completed, the heap is entirely covered with turf or ashes, and left to cool for two or three days. It is then taken to pieces, and the portions still hot are cooled by throwing water or sand on them. 100 parts of wood yield on the average 61 to 65 parts by measure, or 24 parts by weight, of charcoal. (See Watts's *Dictionary of Chemistry*.) The charcoal thus prepared is the best suited for fuel. In England a large quantity of charcoal is obtained in the dry distillation of wood in cast-iron cylinders, for preparation of crude acetic acid: the charcoal thus prepared is preferable for making gunpowder, but inferior for other purposes. A peculiar kind of charcoal of reddish-brown color, hence termed *charbon roux*, is prepared in France, for manufacture of the gunpowder used in sporting, by subjecting wood in iron cylinders to the action of superheated steam under a pressure of two atmospheres: powder made with this charcoal absorbs moisture more rapidly than ordinary gunpowder.

The general properties of wood-charcoal are, that it is black and brittle, and retains the form of the wood from which it was derived; it is insoluble in water, infusible and non-volatile in the most intense heat; has power of condensing gases (see GASES); and, from its power of destroying bad odors, it has been regarded as possessing considerable antiseptic properties. It is frequently stated that charcoal is a poor conductor of heat, but a good conductor of electricity: these properties depend on the nature of the charcoal, the lighter wood, such as willow, yielding a porous charcoal, with little power of conducting heat or electricity; while boxwood yields a very compact charcoal, which is a good conductor of heat and electricity. Charcoal never consists entirely of pure carbon, the degree of purity varying directly with the temperature: thus, charcoal charred at  $480^{\circ}$  contains 65 per cent. of carbon, while that charred at  $750^{\circ}$  contains 80, and that charred at  $2730^{\circ}$  contains 96; but the loss of charcoal occasioned by these high temperatures is very great, the three percentages of charcoal corresponding to these temperatures being 50, 20, and 15.

The uses of wood-charcoal are numerous and extensive. It is very largely used as a fuel, taking in many countries the place of coal. From its being proof against all ordinary chemical agencies, a superficial charring is frequently resorted to for protecting wood from decay, as in the case of piles driven into mud or into the beds of rivers to serve as foundations. For the same purpose, it is a common practice to char the interior of tubs and casks destined to hold liquids. In a finely divided state, it is commonly regarded as an antiseptic; and there is no doubt that the offensive effluvia from animal matter in an advanced stage of putrefaction disappear when the putrefying substance is covered with a layer of charcoal; but in reality the decay goes on, without emission of any odor, till at length the whole of the carbon is dissipated as carbonic acid gas, and the hydrogen as water, while the nitrogen remains as nitric acid. It has been shown that

## WOODCHAT—WOODCHUCK.

the action consists in a rapid process of oxidation, dependent on the power which finely divided charcoal possesses of condensing oxygen. In a finely divided state, charcoal not only condenses gases to a marvellous extent, but has the power of absorbing coloring matters, bitter principles, etc.; hence it is of extensive use in the laboratory. From the rapidity of its absorbing action, Stenhouse has proposed to use a respirator filled with charcoal to protect the mouth and nostrils in an infected atmosphere; and the employment of trays of powdered wood-charcoal in dissecting-rooms, in the wards of hospitals, and in situations where putrescent animal matter is present, is found to exert a most beneficial influence in sweetening the atmosphere, by absorbing and decomposing the offensive gases. These properties render charcoal a valuable material in the construction of filters, not only for decolorizing, but likewise for purifying water for domestic use. It is employed successfully to prevent the escape of noxious vapors at the ventilating openings of sewers, as it allows free passage of air, but condenses the offensive effluvia in its pores, where they are destroyed by a process of oxidation. Besides its use in the manufacture of gunpowder, it has many applications in the arts. In medicine, it is at present used chiefly to destroy fetor; for which purpose it is applied in the form of powder or poultice to gangrenous sores, phagedenic ulcers, etc.; it is also largely employed in tooth-powders, as by its mechanical action it removes incrustations, while by its chemical action it destroys fetor of the breath. In indigestion accompanied by much flatulence, it may be given in doses of two or three teaspoonfuls suspended in water, or may be administered in the form of charcoal-biscuits. Very finely divided poplar charcoal is regarded as the best for medicinal uses.

WOODCHAT, *wúd'chăt* (*Lanius rutilus*): bird which, notwithstanding its name, is not a Chat, but a Shrike (q.v.). Its whole length is about  $7\frac{1}{2}$  in. The upper parts are mostly black, under parts white, with some white on head, wings, and tail; crown of the head and nape of the neck rich chestnut-red. The W. is abundant in s. Europe; and it is an African bird, being found from the Mediterranean to the Cape of Good Hope at all seasons of the year.

WOODCHUCK, *wúd'chăk* (*Arctomys monax*): species of Marmot (q.v.), inhabiting N. America from Hudson's Bay to N. C., and w. to Neb. It is 15 to 18 in. long, grizzly gray, varying to blackish or chestnut color; the form thick, head broad and flat, with almost no apparent neck, legs short and thick, feet large, tail bushy. The hair is rather soft, the whiskers long and stout. This animal digs deep holes in fields, on the sides of hills, or under rocks in woods; its burrow often slants upward, so that water may not enter, and within are several compartments. It passes the winter in the burrow, in a lethargic state. It is easily tamed, and may be fed on bread, milk, and vegetables. It fights successfully with a dog of equal



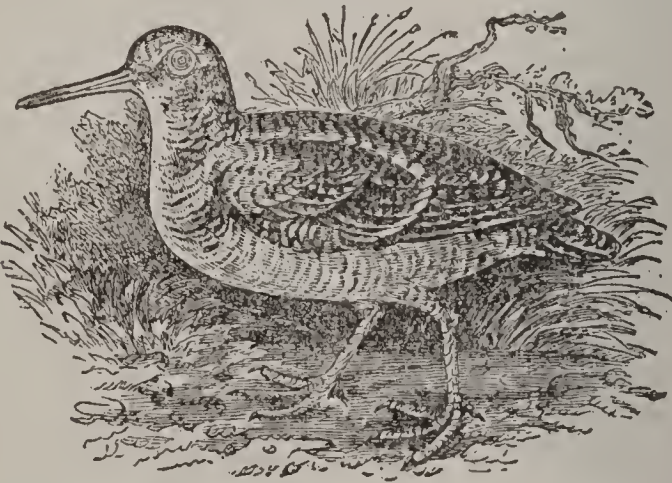
## WOODCOCK.

size. The name of Ground-hog is sometimes popularly given to it. Its flesh is sometimes eaten, but is rank. — The W. feeds on various vegetables, but is destructive particularly to beans and red clover, though it tramples down much more of the latter than it uses for food. The use of traps or poisons, the burning of sulphur or explosion of cartridges in their burrows, are among the means for destruction of these pests.



Woodchuck (*Arctomys monax*).

WOODCOCK, *wûd'kôk*: bird commonly regarded as of the same genus as the Snipe (q.v.), but of more bulky form than the true snipe, and having shorter and stronger legs. The European W. (*Scolopax rusticola*), well known as a

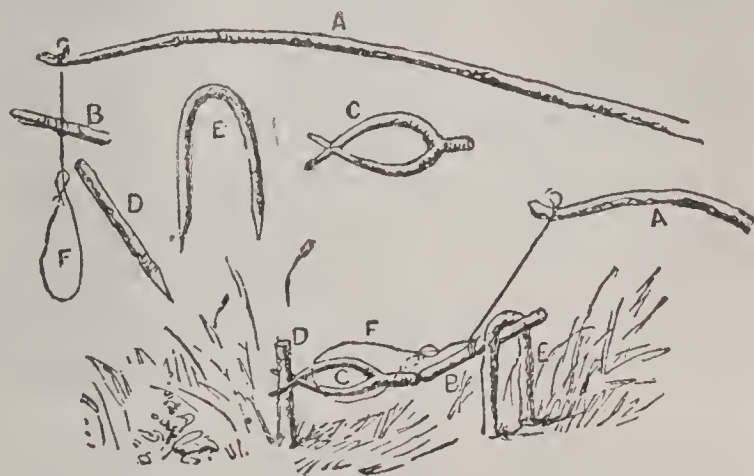


Woodcock (*Scolopax rusticola*).

game-bird in Great Britain, and highly esteemed as a delicacy for the table, is found also in all parts of Europe and n. Asia. It is one of the birds of Japan, and is sometimes found as a straggler in the e. United States. Its summer haunts are chiefly the pine-forests of n. Europe and Asia; but in summer it inhabits higher and dryer ground than in winter, when it is found chiefly in moist woods and swamps, seeking worms, snails, and slugs as food, boring with its long bill in the soft ground. The W. feeds chiefly by night; and the quantity of food which it devours is very great. The W. is about 13 inches in length; upper parts

## WOOD DUCK.

varied with ruddy, yellowish, and ash color, finely intermingled, and marked by large black spots; lower parts yellowish red, with brown zigzag lines; quills striped with red and black on the outer edge; tail-feathers tipped with gray above and white below. The female is rather stouter and larger than the male. As woodcocks usually breed in very dry situations in the recesses of thick woods, the young ones would be left to starve but for the peculiar adaptation which enables the parent to transport them to moist feeding-grounds. It was long believed that the female W. used only her feet for carrying her young from place to place; but Charles St. John, in *Natural History and Sport in Moray*, says that from close observation he found 'the old woodcock carries her young, even when larger than a snipe, not in her claws, which seem quite incapable of holding up any weight, but by clasping the little bird tightly between her thighs, and so holding it tight toward her own body.'—The AMERICAN W. (*Philohela minor*) is a smaller bird than the W. of Europe, being



Woodcock Trap:

The upper portion of the fig. shows the separate parts; the lower portion their arrangement when set. The part C (being only supported in its position by the pressure of B) is displaced by the weight of the bird; this relieves the spring A, and the prisoner is caught by the legs in the running noose F.

(From St. John's *Natural History and Sport in Moray*.)

about 11 in. long; very similar in plumage and habits. Three transverse black bands mark the hinder part of the head. It is found in the United States w. to Neb., in swamps; and is a favorite game-bird.

WOOD DUCK: see SUMMER DUCK.



## WOOD-ENGRAVING.

**WOOD-ENGRAVING**, or **XYLOGRAPHY**, *zī-lōg'ra-fī*: art of engraving designs on wood. It differs from copper and steel plate engraving by having the parts intended to print on the paper in *relief*. While *plates* are printed from the engraved lines by a laborious and necessarily slow process (see **ENGRAVING**), wood-engravings, having the object to be represented on the surface, in the manner of a type, may be printed with the matter that it is intended to illustrate in the ordinary printing-machine—an important point in the illustration of books, on the grounds of cheapness and expedition. Another advantage of wood-engravings is, that they can be multiplied to any extent by means of the Stereotype (q.v.) and Electrotpe (q.v.) processes.



Fig. 1.

The invention of W.-E., like that of gunpowder, has been claimed for the Chinese, whose books have certainly been printed from engraved wood-blocks for ages. It has indeed been asserted that the art of cutting figures in relief, and printing impressions of them on paper, was known and practiced by the Chinese as early as the reign of the renowned Emperor Wu-Wang (B.C. 1120). There is no doubt that wood-stamps were used by the ancient Egyptians and Romans for stamping bricks and other articles of clay; and that wood and metal stamps of monograms, etc., were used in various European countries, for attesting deeds and other documents, at a very early period, when the ability to write was an extraordinary accomplishment even for princes.

## WOOD-ENGRAVING.

It is not, however, until the beginning of the 15th c. that we find any evidence of the existence of W.-E., as we now understand it. It appears to have been used in Germany at that time for printing playing-cards and figures of saints. The earliest print of which any certain information can be obtained is in the collection of Earl Spencer. It was discovered in one of the most ancient convents of Germany—the Chartreuse of Buxheim, near Memmingen, in Bavaria—pasted within the cover of a Latin MS.; it represents St. Christopher carrying the infant Saviour across the sea, and is dated 1423. Fig. 1 is a reduced fac-simile of this curious



Fig. 2.

engraving. It is a work of some merit, notwithstanding its apparent roughness; the infant Saviour and the drapery of the saint being drawn with considerable skill and vigor. The inscription at the bottom has been thus translated: 'In whichever day thou seest the likeness of St. Christopher, in that same day thou wilt, at least, from death no evil blow incur.—1423.' Shortly afterward a series of books printed entirely from wood-engravings, called block-books, were issued. They consisted principally of religious subjects, with short descriptions engraved on the same block. The most important were the *Apocalypsis, seu Historia Sancti Johannis*; the *Historia Virginis ex Cantico Cantorum*; and the *Biblia Pauperum*, the last containing representations of some of the principal passages of the Old and New Testaments, with explanatory texts. The illustrations, of which Jackson, in his treatise on the *History and Practice of Wood-engraving*, gives an elaborate account and several specimens, seem to be drawn with supreme contempt for perspective and proportion, but bear evidence of the draperies and hands and faces having been carefully studied. Fig. 2 is a copy of one of the cuts in the *Apocalypsis*. It represents St. John preaching to three men and a woman, with the inscription: '*Conversi ab idolis, per predicationem beati Johannis, Drusiana et ceteri*'



(By the preaching of St. John, Drusiana and others are withdrawn from their idols). Fig. 3, from the *Biblia Pauperum*, is curious as showing the general manner of representing the creation of Eve during the 15th c., the same subject frequently occurring previous to 1500. Both have the appearance of careful drawings 'spoiled in the engraving.' Previous to the invention of movable types, whole books of text were engraved on wood, and the im-



Fig. 3.

pressions had evidently been taken by *rubbing* on the back of the paper, instead of steady pressure, as in the printing-press, the ink used being some kind of distemper color.

The Psalter printed by Faust and Schöffer at Mentz 1457 (see GUTENBERG) is illustrated with initial letters engraved on wood, and printed in two colors, blue and red, which Jackson considers 'the most beautiful specimens of this kind of ornament which the united efforts of the wood-engraver and the pressman have produced. They have been imitated in modern times, but not excelled.' It is worthy of note that, though printed more than 400 years ago, the freshness and purity of the colors remain unimpaired.

As printing spread, the publication of illustrated books became general in Germany and Italy, and reached England 1476; in which year Caxton (q.v.) published the 2d ed. of the *Game and Playe of the Chesse*, with figures of the different pieces. They are very rude, compared with the earlier German works. Fig. 4 is a reduced copy of the *Knight*, interesting as one of the first wood-engravings executed in Great Britain: several works followed, all in

the same rude manner. The first attempt at something finer than simple lines appears in the frontispiece to the Latin edition of Breydenbach's *Travels*, printed at Mentz by Erhard Reuwich 1486. It is by an unknown artist, and is an elaborate and really very beautiful specimen of the art. It is also remarkable as being the first engraving introducing *cross-hatching* to represent dark shadows. The *Hypnerotomachia Poliphili*, printed at Venice by Aldus 1499, is worthy of mention for the extreme beauty of the designs, ascribed by some authorities to Raphael, by others to Mantegna. About the beginning of the 16th c., a complete revolution in the art of W.-E. was accomplished by



Fig. 4.

the genius of Albert Dürer. His productions exhibit not only correct drawing, but a knowledge of composition and light and shade, and attention to the rules of perspective, which, with the judicious introduction of subordinate objects, elevated them to the rank of finished pictures. Dürer, however, in common with most of the German artists of his day, gave little attention to propriety of costume in his religious subjects; one of his drawings in the *History of the Virgin* (1511), for instance, representing the birth of the Virgin, shows the interior of a German burgomaster's house of his own day, with a number of gossips drinking from flagons and otherwise enjoying themselves. There has been considerable discussion as to the probability of Dürer having also *engraved* his drawings. Most of the best authorities on the subject, including Bartsch, Jackson, and Firmin Didot, agree in the negative. Jackson, who speaks with the experience of a practical engraver, says: 'In most of the wood-cuts supposed to have been engraved by Albert Dürer, we find cross-hatching freely introduced: the readiest mode of producing effect to an artist drawing on wood with a pen or a black-lead pencil, but which, to the wood-engraver, is attended with considerable labor. Had Albert Dürer engraved his own



designs, I am inclined to think that he would have endeavored to attain his object by means which were easier of execution.' See DÜRER, for an account of some of his numerous works. The best of Dürer's contemporary artists on wood were the painters Hans Burgkmair (q.v.), Lucas Cranach (q.v.) and Hans Schäufflein. A series of works projected by Emperor Maximilian, including *The Adventures of Sir Theurdank*, *The Wise King*, *The Triumphs of Maximilian*, etc., were illustrated by these artists; but they are not equal to those of Dürer.

During the first half of the 16th c., the publication of books illustrated with wood-engravings increased. The superiority of talent, both in drawing and engraving, remained with the Germans. In France, though the figure-subjects were inferior to those of their German neighbors, their ornamental borders in prayer-books, etc., of which a great number were printed at this time, were extremely beautiful. In Italy and England the art was very far behind. The most remarkable work published at this time was the *Dance of Death* (q.v.), issued at Lyon 1538. The original ed. of this curious work contained 41 engravings, representing the struggle between Death, generally in the form of a skeleton, and different individuals, such as the Pope, the Emperor, a Judge, Monk, Doctor, Duchess, Old Man, etc. The drawings, characterized by great vigor and skill, are generally understood to have been executed by Hans Holbein (q.v.); but whether he also engraved them, as has been alleged, is more than doubtful. Toward the end of the 16th c., however, the art had made progress in Italy, where some of the best productions of Germany were equalled, if not excelled. In England it made little progress. John Daye published almost the only illustrated books of the time, notably Queen Elizabeth's Prayer-book, which contains a moderately well-executed portrait of that sovereign. There is no certain knowledge about any of the artists or engravers, although John Daye is supposed to have engraved some of his cuts himself. At this time also, the practice of printing wood engravings in colors from different blocks became somewhat common, though the attention of artists in that line was mostly confined to ornamental subjects. From the beginning of the 17th c. the decline of W.-E. may be dated; Germany, the cradle of the art, being the first to forsake it: the only works worthy of notice were a series of blocks on various subjects—designed by Rubens, and engraved by Christopher Jegher of Antwerp, one of the best wood-engravers of that period—some of which are of great beauty. From this time the art fell into neglect, not, apparently, for lack of engravers, since wood-cuts of a certain kind were always produced, but for lack of artists able or willing to make drawings worthy of preservation.

No noticeable change occurred until 1766, when John Michael Papillon, enthusiastic professor of the art in France, published an elaborate history of the subject in an unsuccessful attempt to restore it to its former importance. But it was not until the genius of Thomas Bewick (q.v.)

was brought to bear on it, that W.-E. received that impetus which has made it what it now is—one of the most important of the illustrative arts. Bewick's most eminent works are his histories of *British Quadrupeds* (1790) and *British Birds* (1804); all the quadrupeds, and almost all the birds, were drawn and engraved by himself. The birds especially are executed with a truthfulness and skill which have rarely if ever been equalled. These works are famous also for their collection of tail-pieces, which display immense humor and pathos. Fig. 5 is a reduced copy of one of them—a poor ewe, in the starvation of winter, picking at an old broom in front of a ruined cot. He en-

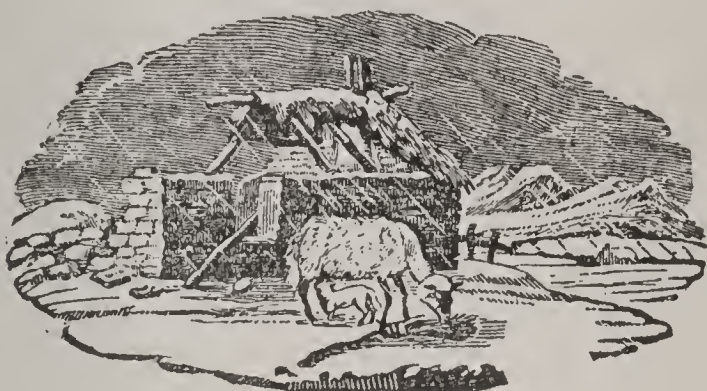


Fig. 5.

tirely abandoned the elaborate system of 'cross-hatching' which prevailed in the works of the older engravers, and produced his light and shade by the simplest possible means—a wonderful effect often resulting from a few lines.

Since Bewick's time, W.-E. has flourished without interruption. He left several pupils, the most successful of whom were Nesbet, Clennell, and William Harvey. Harvey, however, forsook the burin for the pencil; and his drawings illustrating Milton's *Paradise Lost*, Thomson's *Seasons*, etc., especially those engraved by John Thomson (perhaps the most skilful engraver that ever lived, and a pupil of Robert Branston, a self-taught engraver), still retain a first-class place as specimens of wood-engraving. The establishment of the *Illustrated London News* (1842) tended greatly to familiarize the public with the beauties of W.-E. In the pages of that periodical appeared the first drawings on wood of John Gilbert and Birket Foster. The spirited figure-subjects of the former, and the exquisite landscapes of the latter, have done much to raise the art to its present high place in England.

Of late years the art has made very great progress in France and Germany. The style of engraving, however, is so different from the English that a practiced eye can distinguish a French wood-cut at a single glance. The professors of the arts of drawing and engraving on wood in the present day are so numerous, and their works generally so well known, that it would be needless, even if space permitted, to attempt even to enumerate them.

In the United States, wood-engraving dates from near



the end of the 18th c., when Bewick's well-known English success led Alexander Anderson, engraver in New York, to try his hand on wood. He became an illustrator of publications, both home and foreign, and was employed by the Amer. Tract Soc. He had pupils in the art, such as Garret Lansing and others. But the quality of work was rude and in small demand; even in 1838 it is stated that there were not more than five engravers on wood in this country. The Amer. Tract Soc. did much to encourage more refined work, and the improvement has been very gradual, as shown by the comparatively coarse engraving in Harper's periodicals so late as the time of the civil war, or even later. Benson J. Lossing, taking up the art 1838, furnished many good examples of original engravings in his historical publications, to 1886. Harper's *Illustrated Bible* (1843) was a step in advance, due to the skill of Alexander Adams. Henry Marsh's remarkable work in illustrating Harris's *Insects Injurious to Vegetation* (1862) was one of the first examples of a departure from traditional style and of the susceptibilities of wood. From that time progress has been so rapid that American wood-engraving has become famous as superior to that of any other country. The most recent school among us numbers many engravers of so much note that their names are affixed to the articles in the table of contents of the *Century* and *Scribner's Magazine*, or on the title-pages of books. The effort to be original, however, as shown especially in the leading magazines, sometimes runs into libellous affectation (e.g., the frontispiece tornado or desperado portraits of distinguished authors in one of the magazines), or into a style analogous to the impressionist vagaries that are palmed off as paintings. Woodberry characterizes the recent 'fad' as showing 'a disregard of substance, shape, and material; a neglect of relief and perspective; a crowding the ground with meaningless lines, undirected, misdirected, or uselessly refined.' Others defend it as giving light, shade, body, without non-natural line-work.—Designs are now often photographed on the wood, instead of being drawn and tinted, and the peculiarities of manipulation may be due in large part to this method of preparation. Among the most noted and skilful of the present school are T. Cole, F. S. King, F. French, H. Wolf, H. W. Peckwell, G. Kruell, F. A. Wellington, F. A. Petit, A. Lindsay, W. M. Aikman, Closson, H. Baker, and others. Photo-engraving has already superseded much of the hand-work, and certainly has attained the seeming utmost of marvellous beauty in its best examples. See Linton and Woodberry's histories of wood-engraving, 1882 and 3, and articles on the subject in *Scribner's* and the *Century*.

*Practice of Wood-engraving.*—The wood used for engraving is boxwood, which has the closest grain of any wood, known. It is largely imported from Turkey for the purpose, as there it grows to a good size. It is cut *across* the grain in slices, which are dressed to the same height as type, for convenience in printing. Inferior kinds of wood, such as American rock-maple, pear-tree, plane-tree, etc., are used

## WOOD-ENGRAVING.

for coarser purposes; and for very large and coarse subjects, such as posting-bills, common pine is used, and cut on the *side* of the wood with chisels and gbuges. When *blocks*—as the pieces of wood are termed—are required of a larger size than a few inches square, it is necessary to join two or more pieces together, as the amount of *sound* wood to be got out of even a large slice is extremely limited. There is, however, for all practical purposes, no limit to the joining process, as blocks have been printed consisting of 50 to 100 pieces. The wood having been made very smooth on the surface, and squared to the required size, is prepared for the artist by being covered with a preparation of white (commonly water-color Chinese white); this gives a very good surface for the pencil to work on. The subject is then drawn in the ordinary way, the tints being generally washed in with India-ink, and the details filled in with pencil. When the drawing is finished, it is given to the engraver, who, before beginning, carefully covers the block with paper, fastened round the edges with bees wax; this is necessary, to avoid rubbing the drawing out in the process. As the engraving proceeds, he gradually tears the paper off.

The tools or gravers necessary in W.-E. are of three kinds—viz, gravers proper (fig. 6, *a*); tint-tools (fig. 6, *b*); and scoopers, or cutting-out tools for clearing out the larger pieces (fig. 6, *c*). They are arranged in different

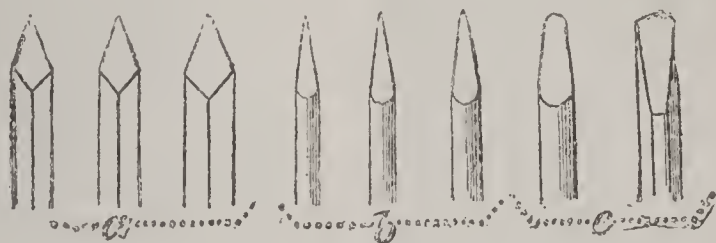


Fig. 6.

sizes, to suit the different portions of the work. Fig. 7 represents the method of using the graver. Most engravers

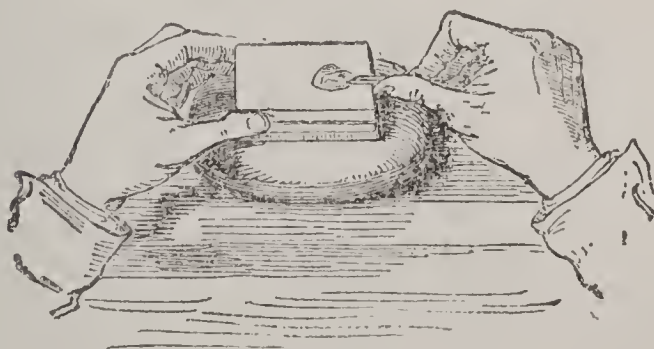


Fig. 7.

use a glass of slight magnifying power, more for relieving the eyes from the strain of fixing both eyes closely on a small object, than for magnifying the work. When gas or other artificial light is used, a glass globe filled with



## WOOD-ENGRAVING.

water, slightly tinted with blue (to neutralize the reddish glare of the light), is placed between the flame and the work: this serves the double purpose of concentrating the light on the block and keeping it out of the eyes. When the drawing is in outline, or mostly so, the engraving is very simple: the process consists of engraving a line along each side of the pencil lines, which are, of course, to be left in relief, and afterward cutting out the pieces between. It will thus be understood that every part of a wood-cut which prints on the paper is the surface of the wood left untouched, and that every white part is cut or hollowed out. Fig. 8 represents a little subject *outlined*; fig. 9 is the same subject *finished*. When it is complicated with much shading, trees, etc., it becomes much more difficult, and brings into play the artistic talents of the engraver to preserve the proper shades, or *color* as it is technically termed, and texture of the different objects. Some engravers of the present day are celebrated for their power of producing beautiful pictures altogether by 'graver-work' from drawings made entirely with the brush. Skies and flat tints are engraved with tint-tools, which, from



Fig. 8.



Fig. 9.

their shape, are best adapted for cutting straight lines; and by judicious use of the different sizes, the lines are left wider or closer, thicker or thinner, as the tint is wanted darker or lighter. As already mentioned, the tools are arranged in sizes—i.e., those for light tints are broader at the points than those for dark tints, so as to cut out more white. Trees, foregrounds, etc., are cut with *gravers*, which, as they are like a lozenge in shape, give more scope for freedom of handling.

When the drawing is all engraved, a proof is taken by inking the surface gently with printing-ink on a dabber (a ball of cotton covered with silk), and, a piece of *India-paper* being laid on it, by rubbing the paper with an instrument called a *burnisher*, until it is all printed. The engraver then sees what touching up is required before it is finished and ready for the printer.

When large blocks are to be engraved, the pieces of

wood are joined with screw-bolts, and the drawing prepared in the usual manner; after which the pieces can be taken apart for convenience in engraving, also for more rapid finishing by having an engraver working at each piece: a point of importance in many cases—e.g., in the large engravings in the illustrated newspapers.

As W.-E., however, is a slow process, many attempts have been made to introduce a substitute for it. The point aimed at is to produce by some process of etching (see ENGRAVING), or otherwise, an engraving in relief directly from the drawing of the artist, without intervention of the engraver at all. Many processes have been invented for this purpose, being various modifications of Zincography (q.v.) Graphotype (q.v.), and Lithography (q.v.). The most successful plan is based on the method devised in France about 1860 by Gillot, and introduced into England by Leitch (hence often called *Leitch's Process*). A *Gelatine Process* is now largely used in the United States. A photograph from an engraving or a drawing in lines is placed above a plate of gelatine, chemically sensitized. The parts of the gelatine exposed to the light become quite hard, and the rest is brushed away with warm water. From the plate an electrotpe may be taken directly. Compare PHOTOGRAPHIC ENGRAVING: PHOTOGRAPHY.

See Hamerton's *Graphic Arts* (1882); Woodberry's *History of Wood-engraving* (1883); Marx's *Wood-engraving* (1881); Linton's *Wood-engraving in America* (1882); Jackson and Chatto's *History and Practice of Wood-engraving* (new ed. 1861); Papillon's *Traité de la Gravure en Bois* (1766); Bartsch's *Peintre-graveur*; Ottley's *Inquiry into the History of Engraving on Copper and Wood*; Firmin Didot, *Essai sur l' Histoire de la Gravure sur Bois* (1863).

WOOD'EN-WALL: the side of a ship; hence, a ship itself. The expression Wooden-walls, as referring to the protection of a country by its navy, is by some writers traced to the utterance of the oracle at Delphi when Athens was in imminent danger from the Persians, B.C. 483, during the invasion of Xerxes. The oracle, intimating disaster for the city, added that a wooden wall should still shelter her citizens. This was interpreted as referring to ships; a great naval force was prepared; and the result was the victory of Salamis.

WOODFORD, *wûd'ford*, JAMES RUSSELL, D.D.: Anglican prelate: 1820, Apr. 30—1885, Oct. 16; b. Henley-on-Thames. He graduated at Cambridge 1842, with high honors in math. and classics; was ordained 1843; and ministered at Easton 1847–55, Kempsford 1855–68, and Leeds. He was examining chaplain of Bp. Wilberforce, from whom he received the honorary canonry of Christ-Chh., Oxford. He was select preacher at Cambridge repeatedly. In 1873 he was consecrated bp. of Ely. Besides several vols. of sermons and charges, he published *Lectures on the Creed*, and on *The Church, Past and Present*. After his death were issued *The Great Commission*, 12 addresses (1886), and two vols. of sermons (1887).



## WOODFORD—WOODHULL.

WOODFORD, STEWART LYNDON, LL.D.: lawyer: b. New York, 1835, Sep. 3. He entered Yale, but graduated at Columbia 1854, and studied law, which he practiced in New York. He was U. S. asst. atty. for the s. dist. of New York 1861-2. He was in the army 1862-65, serving as chief of staff to Gen. Gillmore, and subsequently commandant of Charleston and Savannah, with brevet rank of brig.gen. After the war he entered public life as a republican; was lieut.gov. of New York 1868-70; candidate for gov. 1870; mem. of congress 1872; and U. S. dist. atty. for s. New York 1877-83. In 1897 he was appointed minister to Spain, which post he held till the beginning of the war with Spain when the office became vacant.

WOODFORD, WILLIAM: soldier in the revolution: 1735-1780, Nov. 13; b. Carolina co., Va. He bore an honorable part in the French and Indian wars; and at the beginning of the revolution, 1775, was appointed col. of the 2d Va. regt. At Hampton Roads he saved the town of Hampton, repulsing Lord Dunmore, five of whose vessels were sunken; and was in command at Great Bridge, on Elizabeth river, defeating the British without loss of a man, while 55 of the enemy were killed. Summoning the militia of Norfolk and Princess Anne counties, he took possession of Norfolk. In 1777, Feb., he was commissioned brig.gen.; commanded the 1st Va. brigade; fought and was wounded at the battle of Brandywine; and was prominent in the battles of Germantown and Monmouth. Sent to the relief of Charleston, S. C., he marched his force thither, 500 m., at the rate of 18 m. per day; was taken prisoner 1780, May 12, the month after his arrival, and sent to New York, where he died. A county in Ky. and another in Ill. were named in his honor.

WOODHOUSE, *wûd'hows*, ROBERT: English mathematician: 1773, Apr. 28—1827, Dec. 23; b. Norwich, England; cousin of Amelia, authoress, and wife of the painter Opie. W. graduated at Cambridge 1795, with high honors; was fellow 1798; prof. of math. 1820; prof. of astron. and experimental philos. 1822; and first director of the observatory 1824. His works are said to have revolutionized mathematics. He published *Principles of Analytical Calculation* (1803); *Plane and Spherical Trigonometry* (1809); *Isoperimetrical Problems and the Calculation of Variations* (1810); and *Elementary Treatise on Plane Astronomy*, (1812), republished as *Treatise on Astronomy*, 2 vols. (1818-23). He died in London.

WOODHULL, *wûd'hûl*, JOHN, D.D.: Presbyterian divine: 1744, Jan. 26—1824, Nov. 22; b. Miller's Place, Long Island, and of a family distinguished in colonial and revolutionary history. He graduated at Princeton 1766; was pastor of Leacock Presb. Church, Lancaster co., Penn., 1770-79; and in 1777 mustered all the men of his parish to reinforce the patriot army at Valley Forge, himself acting as their chaplain. Called to Freehold, N. J., 1779, he advised Gen. Washington to retaliate for the murder

## WOODHULL—WOOD-LOUSE.

by the British, without trial, of Capt. Joshua Huddy, at whose funeral Dr. W. had preached to a great concourse. In 1785 he was on the committee that devised the present organization of the Presb. body; and 1812 he assisted in founding Princeton Theol. Seminary. He died in Freehold. Several of his published sermons are extant, including *The Establishment of the Federal Constitution* (1787); and *The Death of General Washington* (1799).

WOOD'HULL, MAXWELL: naval officer: 1813, Apr. 2—1863, Feb. 19; b. New York; only son of the founder of Williamsburgh, L. I., Richard Miller Woodhull. He entered the navy 1832, June 4, and after service in the Mediterranean, on the coast of Africa, at Brazil, and in the Gulf of Mexico, he engaged in the survey of New York harbor, made plans for removal of obstructions from Hell Gate, and executed surveys on the New England coast. In the civil war, with rank of commander 1861, July 1, he organized the supply service for the blockading fleet, commanded a division of the James river flotilla in the Peninsular campaign, was later attached to Admiral Wilkes's flying squadron in Fla. waters, and after being ordered north was accidentally killed.

WOOD'HULL, NATHANIEL: revolutionary soldier: 1722, Dec. 30—1776, Dec. 10; b. St. George's Manor, Long Island, N. Y.; great-grandson of Richard W., colonist (1648). In the French war he was a major under Abercrombie, 1758, in the attack on Crown Point and Ticonderoga; later he served under Bradstreet against Fort Frontenac, and under Gen. Amherst 1760. He was a representative of Suffolk co., L. I., in the N. Y. colonial assembly 1769-75, and on the suspension of the colonial govt. 1775, May, and the rule of the provincial congress until 1777, Apr., he was pres. of this provincial body 1775 and 6. He had been a col. from 1760, and was made a brig.gen. 1775, Aug. On the landing of Brit. troops on Long Island, he commanded the local militia, and shortly after the battle of Long Island was surprised by Brit. light horse, and so severely wounded as to cause his death.

WOOD-LOUSE: isopodous terrestrial crustacean of the

genus *Armadillo* (q.v.) or of the genus *Oniscus*, and family *Oniscidae*. The larger kinds of Wood-louse are known as sow-bugs and pill-bugs, and are popularly mistaken for insects. Wood-lice are terrestrial, and the respiratory organs are completely enfolded by plates developed from the abdominal members; the anterior plates being perforated by a row of small holes, through which the air has access to the gills. They frequent damp situations, and are generally found in dark and concealed places, under stones, in holes of walls, under the decaying bark of trees, etc. They feed on decaying animal and vegetable matter.



Wood-louse  
(*Oniscus murarius*).



## WOOD-OIL—WOODPECKER.

They run with some celerity when apprehensive of danger, and sometimes also roll themselves up into a ball, so as to exhibit only the plates on the back. The eggs are inclosed in a pectoral pouch. One species is popularly known in Scotland by the name *Slater*.

**WOOD'-OIL:** name given by Europeans in India to a balsamic fluid, not really an oil, obtained from the trunks of trees chiefly of the order *Dipteraceæ* (q.v.). The wood-oils of Indian commerce are generally named from the countries or places from which they are brought, and it is not yet known what trees yield particular kinds, though it is certain that most of them are produced by species of *Dipterocarpus*. The name *Gurgina Balsam*, or *Goorjun Balsam*, is frequently given to one of the most common kinds, product of the Goorjun-tree, *Dipterocarpus turbinatus*, and other species of *Dipterocarpus*. Wood-oil is produced chiefly on the Burmese coast and in the more s. and e. regions. It is obtained by tapping the tree, and applying heat to the incision; or by felling the tree, cutting a hole in the trunk, and kindling a fire in it, a groove being made for the exuded fluid to flow into pots placed to receive it. The trees being often very large, a single tree sometimes yields seven tuns of oil. Wood-oil is used in medicine as a substitute for Copaiva (q.v.); and in the arts as a varnish, often in combination with colored pigments, and even as a substitute for tar in paying the seams of shipping. It is very effectual in preserving timber from attacks of white ants. It is sometimes used in making lithographic inks. Wood-oil has a fine aromatic odor, resembling cedar. When allowed to remain at rest for some time, it separates into two layers, the upper consisting of a clear chestnut-colored liquid balsam, and the lower a kind of resin in flakes. It is, of course, this resinous part only which remains when it is used as a varnish, and the varnish has dried.

**WOOD'PECKER:** a bird of the genus *Picus*, family *Picidae*, and order *Scansores*; so named from its habit of piercing the bark of trees in search of its food. The toes are in pairs, two before and two behind, with sharp strong claws; the bill is rather long, straight, and wedge-shaped, with hard tip, tip and sides compressed; tail is usually lengthened and rigid, though in some it is short and rounded; the vertebræ of the neck are greatly developed, and the last of the caudal vertebræ is very large, with a long ridge-like spinous process; the whole structure adapting these birds to run and climb with great facility on the stems and branches of trees, in which they aid themselves by the tail, like Creepers (q.v.), and to seek their food, chiefly insects and their larvæ, by digging in the bark and wood of trees with their bill. In addition to the particulars already noticed, they have the tongue fitted to serve as an important instrument in obtaining their food; the branches of the hyoid bone being greatly elongated backward, and in front moving as in a sheath; a peculiar arrangement and development of muscles enabling them to extend the tongue far beyond the bill; its tip being

## WOODPECKER.

horny, and furnished with barbed filaments, while its surface is covered with a glutinous saliva, secreted by two large glands. Their powers of flight are very moderate, and the keel of the breast-bone is small. The Barbets (q.v.) and Wrynecks (q.v.) are referred to the family *Picidæ*. Woodpeckers are diffused over almost all parts of the globe, but abound chiefly in warm countries. The species are very numerous. They are mostly solitary in their habits, and live in the depths of forests. They feed in part on fruits and seeds as well as on insects; but much of their time is spent in pursuit of these, and they may be



Green Woodpecker (*Picus viridis*).

heard at a considerable distance, tapping the wood of trees with their bill, to discover the place where an insect is lodged, and to reach it when discovered. The common notion that they are very injurious to trees is erroneous, as they do more good by preventing the ravages of insects than harm by their pecking. They strike out chips of wood with their strong bill, and in this way enlarge holes in decayed parts of trees for a roosting-place or a nest, carrying away the chips to a distance, especially in the case of a nest, as if for precaution that it may not be discovered. The nest consists of a mere hole in a tree, perhaps with a few chips in the bottom of it, but with no other lining. The plumage of woodpeckers is generally of strongly contrasted colors, black and white, or green and yellow, with red marks about the head. There are several well-marked groups of woodpeckers, differing in form, plumage, and habits, and of different geographic distribution.

The most common species in the central portions of the United States are the Red-headed W., and the Golden-winged W. (otherwise called the Yellow-hammer, Flicker, and High-roller), which has a near relative in the Red-shafted Flicker of the west, e. to Kan. At certain seasons, the Hairy W., lengthwise streaked, and the Downy W., smaller and exactly similar (except the outer tail-feather, barred black and white), are common. The Yellow-bellied W. is said to be the only N. Amer. species that injures



trees. The Red-bellied W. is most frequent s. and west. The Red-cockaded W., a red line on each side of the head, is found in swamps in the s.e. states, n. to Penn. The Black-backed W., the crown yellow in the male, and the similar *Picoides americanus*, the back with white, are far n. species, s. in winter to the n. states. The Ivory-billed W., the crest scarlet in the male, black in the female, is southern. The great Logcock, length  $1\frac{1}{2}$  ft., front of the scarlet crest black in the female, is shy and rare, in dense forests.

Only four species are found in Britain, and one of them, the Great Black W., rare, is about 16 in. long; black, with a red cap on the head. It is found in the pine-forests of many parts of Europe.—The Great Spotted W. (*P. major*), called also French Pie and Wood Pie, not uncommon in England, is found on the continent of Europe from Norway to the Mediterranean: it is about nine inches and a half in length. The color is black, varied with white, under parts grayish white; back of the head in the male bright scarlet. The Lesser Spotted W. (*P. minor*), about five inches and three-quarters, is widely distributed in Europe and n. Asia.—The most plentiful of all Brit. species of W., the Green W., is common on the continent of Europe from Scandinavia to the furthest south. It is about 13 in. in length, and is mostly of dark-green color, tinged with yellow; crown and back of the head, bright scarlet. Among its popular English names are *Woodspite*, *Yaffle*, *Whetile*, and *Woodwall*. The Green W. belongs to a group or section of woodpeckers entirely confined to the old continent, and more frequently seen seeking their food on the ground than are the more typical species.—The genus *Picumnus* is the type of a group of *Picidae* called *Piculets*, very small birds, with bill hard at the tip, broad rounded wings, and short tail with broad rounded feathers, not used for support, departing from the typical characters of the family. They inhabit warm parts of S. America, India, and the Eastern Archipelago.

**WOOD-PRESERVING:** preventing the decay of wood from damp, atmospheric action, or the destructive operations of animals and parasitic plants. Several processes have been employed. The principle in all has been the same—the injection into the vessels of the wood of some mineral material, which, by combining with the albumen of the woody tissue, prevents its decomposition, or gives it a poisonous character. The chief of the methods in use are that called Kyanizing (q.v.), creosoting, in which the preserving material is the so-called creosote, or crude carbolic acid of coal-tar, and the Boncherie process, used chiefly on the continent of Europe. In this last a solution of sulphate of copper is used. While the tree is still growing, the head of the tree is cut off, and the top of the bare stem is hollowed into the form of a bowl, which is then filled with the solution, which is afterward supplied as required. The liquid penetrates downward, killing the tree as it goes, but giving to the wood a remarkable durability, particularly for such purposes as railway sleepers, etc.

WOODRUFF, *wúdrűf*, or WOOD' ROOF, -rűf: plant of the genus *Asperula* and nat. order *Rubiaceae*, with whorled leaves, native of n. parts of the old world, and distinguished by a funnel-shaped or bell-shaped corolla, a bifid style, capitate stigma, and dry didymous fruit. The Sweet W. (*A. odorata*) is common in shady woods in all parts of Europe. It has a creeping root, a stem 5-10 in. long, weak and sub-erect, four or five whorls of lanceolate leaves, 6-8 in the whorl, rough at the edge and keel, and small white flowers. The plant, when dried, has a very agreeable fragrance, similar to that of *Anthoxanthum odoratum* (see VERNAL-GRASS) under similar circumstances. It forms an agreeable herb-tea, and enters into the composition of the popular *May-drink* of the Germans.—DYER'S W. (*A. tinctoria*) is a native of the continent of Europe and of Siberia, a perennial, with reclining stems about 12 in. long, whorls of 6 or 4 linear leaves, upper leaves opposite, flowers whitish. The root is used in Dalmatia and elsewhere instead of madder; but the crop obtained from a field is inferior in quantity to that of madder.—For flavoring, the Germans in this country use the SWEET-SCENTED BEDSTRAW (*Galium triflorum*), of the same family, and with odor much like that of Woodruff; it is procumbent, the fruit bur-like, with hooked bristles, the flowers in threes, greenish; it is common in woods that have a rich soil.



Woodruff  
(*Asperula odorata*).

WOOD'-RUSH: see LUZULA.

WOODS, *wűdz*, CHARLES ROBERT: soldier: 1827, Feb. 19—1885, Feb. 26; b. Newark, O.; son of Ezekiel S. W. He graduated at the U. S. Milit. Acad. 1852; served on garrison and frontier duty to 1861; was in the attempt to relieve Fort Sumter 1861, Apr.; and in command of troops; was made col. of 76th Ohio vols. 1861, Oct. 13; was at Fort Donelson, Shiloh, Corinth, and Vicksburg; was made brig.gen. of vols. 1863, Aug. 4; and served at Lookout Mountain and Mission Ridge. He commanded a division in the campaign through Ga. and the Carolinas; was made maj.gen. U. S. army 1865; was on the plains fighting Indians in the latter part of 1866; and 1874, Dec., was retired.

WOODS, LAKE OF THE: see LAKE OF THE WOODS.



## WOODS.

WOODS, *wûdz*, LEONARD, D.D.: Congregational theologian: 1774, June 19—1854, Aug. 24; b. Princeton, Worcester co., Mass. In the intellectual atmosphere of his home he early became interested in philosophical questions. He graduated at Harvard 1796, and after studying theol. was pastor in West Newbury, Mass., 1798–1808, when his articles in the *Panoplist*, defending Calvinism, led to his election to the chair of theology in Andover Seminary, which he held from the founding of that institution, 1808, to 1846, after which he was emeritus prof. until his death, in Andover. He was also the presiding member of the faculty. While firm in the doctrines, he was fair and liberal in spirit. His collected works, in 5 vols. (1849–50), include discussions of Unitarianism, Perfectionism, Swedenborgianism, lectures on church government, on inspiration, etc. He wrote also, but did not publish, a history of the theol. seminary. His book of memoirs of Amer. missionaries was published 1833. He was prominent in the formation of the Amer. Tract Soc., Temperance Soc., and the American Board of Foreign Missions, on whose prudential committee he served a quarter of a century.

WOODS, LEONARD, Jr., D.D., LL.D.: scholar: son of Prof. Leonard W. of Andover; 1807, Nov. 24—1878, Dec. 24; b. Newbury, Mass. He graduated at Union Coll. 1827, and at Andover Theol. Seminary 1830, continuing his studies there three years longer, while asst. instructor of Hebrew, and collaborator with Prof. Stuart in commentaries and with Prof. Robinson in editing the *Biblical Repository*. At this time he published his annotated translation of Knapp's *Christian Theology*. He had been the foremost scholar in acad., college, and seminary. In 1834–37 he edited the *Literary and Theological Review* in New York, offending many of its supporters by objecting to reform societies and revival methods, and to the conditions often required for admission to Presb. and Congl. churches. He favored the so-called Oxford theology. After a professorship of sacred lit. in Bangor Seminary 1836–39, and a brilliant service as the president of Bowdoin Coll. 1839–66, he was commissioned to seek materials abroad for a hist. of Maine, and published 1868 the *Discovery of Maine*. His health failing, his materials were printed by the Maine Hist. Soc. His addresses on several occasions were published. He died in Boston.—See memorial by Prof. Edwards A. Park (1880), and sketch by Richard H. Dana in the *Century Magazine* (1881).

WOODS, WILLIAM BURNHAM: soldier and jurist: 1824, Aug. 3—1887, May 14; b. Newark, O.; son of Ezekiel S. W., who was a native of Ky., of Scotch-Irish descent. W. graduated at Yale 1845, studied law at home, and began practice; was elected mayor of Newark 1856 and 7; chosen to the legislature, and was speaker 1858, re-elected 1859. He became lieut.col. of vols., and served from 1861, Nov. to the close of the war, being almost constantly at the front, and in many battles. He became full brig.gen. 1865, May 31. On leaving the army 1866, Feb.

## WOODS AND FORESTS—WOOD'S HOLL.

17, he settled in Ala. as a cotton-planter and lawyer; became state chancellor 1868, U. S. circuit judge 1869, and justice of the U. S. supreme court from 1880, Dec. 22.

WOODS AND FORESTS, AND LAND REVENUES, COMMISSIONERS OF: in Great Britain, a board of not less than two nor more than three commissioners for administration of all land revenues of the crown: they act under control of the treasury. The yearly receipts from this source are about £375,000.—See WORKS, BOARD OF.

WOOD'S HOLL, *wúdz hól*: village in Barnstable co., Mass.; on Buzzard's Bay, and on the Old Colony railroad; 4 m. s.w. of Falmouth, 20 m. e.s.e. of New Bedford, 71 m. s.e. of Boston. It has long been widely known as a harbor of refuge for shipping and as a delightful summer place for invalids, and in recent years has been the scene of important experiments in the propagation of sea-fish by the U. S. Fish Commission. It has a number of summer boarding-houses, a church, school, fertilizer factory, and regular steamboat-communication with Martha's Vineyard (7 miles).



## WOODSTOCK—WOODWALE.

**WOODSTOCK:** town, Windham co., n.e. Conn.; on the Quinebaugh river; 41 m. e.n.e. of Hartford, 5 m. n.w. of Putnam. Its principal industry is the manufacture of twine. It has a beautiful park, the scene of celebrations on Independence Day, and is the seat of an excellent academy. Pop. (1880) 2,639; (1890) 2,369; (1900) 2,095.

**WOODSTOCK:** city and port of entry, cap. of Oxford co., Ontario, Can.; on the Thames river and Cedar Creek, and on the Canadian Pacific and the Grand Trunk railroads; 49 m. w. of Hamilton, 29 m. e.n.e. of London. It has good water-power, piano and organ factories, tanneries, flouring-mills, furniture-factories; and manufactures agricultural implements. It is the seat of Woodstock Coll. (Bapt.).—Pop. (1891) 8,612; (1901) 8,833.

**WOODSTOCK**, *wúd'stök*: small town and ex-parliamentary borough, Oxfordshire, England; 8 m. n.n.w. of Oxford. The pop. (1891) of the borough (which included several adjacent villages and hamlets) was 7,308; being much larger than that of the town, which contains only 1,200 inhabitants. The manufacture of fawn-skin gloves employs about 1,200 persons in the town and neighboring villages. W., or rather old W., a little n. of the present town, was a residence of the early English kings; but no remains of the ancient palace exist. Edward the Black Prince was born here; here Elizabeth was held prisoner by her sister Mary; and Chaucer resided here for some time. W. is notable also in connection with Fair Rosamond, the mistress of Henry II.; though it is now doubted whether the labyrinth or maze which Henry is said to have constructed for her ever existed. In the immediate vicinity is Blenheim Park, the seat of the Duke of Marlborough.

**WOOD'-SWALLOW:** a bird of the genus *Artamus* and family *Ampelidæ*, or Chatterers (q.v.). Wood-swallows resemble swallows in many of their habits, but differ in the structure of their bills and feet. The bill is very broad at the base, and arched; upper mandible thick, but not ridged; gape furnished with bristles; nostrils wide apart, naked; feet short and strong; wings very long and pointed; tail short. Their flight is rapid. Their food consists chiefly of seeds. They are natives of the E. Indies and of Australia. An Australian species (*A. sordidus*) is sometimes seen in great numbers, and is remarkable for the habit of suspending itself in clusters on dead branches, like a swarm of bees, one bird clinging to another, so that as many thus hang together as would fill a bushel.

**WOODWALE**, n. *wúd'wāl* [O.Dut. *weduroael*, a kind of yellow bird: Ger. *witterwal*, a yellow thrush: origin uncertain]: an old name for a bird of a yellowish color; the wood-hack; see WITWAL.

## WOODWARD—WOOD AND WOODY FIBRE.

WOODWARD, *wú'd'wèrd*, CALVIN MILTON: educator: b. Fitchburg, Mass., 1837, Aug. 25. He graduated at Harvard 1860, became principal of a high school at Newburyport, Mass., went into the civil war as capt. in 48th Mass. vols., and was at the siege of Port Hudson under Gen. Banks. He became, 1865, vice-principal of the Smith Acad. of Washington Univ., St. Louis; and asst. prof. of mathematics 1868 in the univ. He was advanced 1870 to the chair of mathematics and applied mechanics, and made dean of the Polytechnic School. In addition to these duties he organized 1879 a manual training school of the univ., and became its permanent director, and the representative in America of manual training in education. He was pres. 1882–84 of the industrial dept. of the National Educational Assoc., and 1885 presented his views of manual training to an educational conference in Manchester, England. He published *The Manual Training School: its Aims, Methods, and Results* (1887).

WOOD AND WOOD'Y FIBRE: fibrous material which constitutes the principal portion of the substance of trees. Flowering plants agree with the higher cryptogams (ferns, club-mosses, horsetails) in the possession of 'fibro-vascular bundles' (see VASCULAR TISSUE)—longitudinal strands of tougher consistence than the Cellular Tissue (q.v.) by which they are surrounded. These bundles always contain two main constituents, *wood* and *bast*, arranged either in a *collateral* or in a *concentric* manner: in the former case the wood and bast are placed side by side in the bundle, and in the latter the bast surrounds the wood. In flowering plants the former arrangement prevails; in vascular cryptogams the latter. In cryptogams and monocotyledons the bundle is incapable of growth after its first formation, all the embryonic tissue being used up at once; but in dicotyledonous plants (see EXOGEN) the bundles exhibit continuous increase in thickness throughout the life of the plant, by virtue of the persistence in active growth of a layer of embryonic tissue, the Cambium (q.v.), which remains in the middle of the fibro-vascular bundle, interposed between wood and bast, both of which thus increase in thickness. Since the bundle lies in the cellular matrix with its woody portion directed toward the centre and its bast toward the circumference, the interposed cambium deposits each new layer of wood *outside*, and each new layer of bast *inside* the former ones; and the term *exogenous*, commonly applied to the growth of dicotyledonous stems, is thus seen to be applicable as regards the woody portion of their fibro-vascular bundles only.

The fibro-vascular bundles of monocotyledons lie scattered separately through a cellular matrix, the *ground-substance* of the stem, which thus rarely possesses any great consistence, and has no separable bark. In dicotyledonous stems, on the other hand, the bundles anastomose at frequent intervals in their course along the stem; and this characteristic distinction can be readily seen by examining the stems of any two types of these groups,



## WOOD AND WOODY FIBRE.

say of a lily or of a geranium, or more simply by inspection of their leaves, in which a similar arrangement of bundles prevails—that of the former exhibiting parallel, that of the latter reticulated venation. The cambium, too, tears readily; thus dicotyledons have a separable bark.

In the dicotyledonous stem, that portion of the cellular ground-substance which remains at the centre within the bundles is termed *Pith* (q.v.); that which lies wholly exterior to them under the epidermis is the cellular envelope; while the narrow plates of cells lying between and separating the anastomosing bundles, and thus connecting the central pith with the circumferential cellular envelope, are known as the medullary rays, or ‘silver grain.’

In both wood and bast, three main constituents are typically present—first, cells little modified from the ordinary shape, and termed *parenchyma*; secondly, cells greatly elongated and having their walls considerably thickened, these being termed *fibres* or *prosenchyma*; thirdly, vessels or cell-fusions, formed by union of longitudinal rows of cells. Wood-vessels are known as dotted, spiral, annular, etc., according to the mode in which their thickening is deposited. All the constituents of stems are thus modifications of three main systems of tissue:

- |   |                             |                           |
|---|-----------------------------|---------------------------|
| I. Epidermis.   |                             |                           |
| II. Ground-substance (pith, medullary rays, cellular envelope). |                             |                           |
| III. Fibro-vascular bundles—                                    |                             |                           |
| Wood—   | (Cambium,<br>when present.) | Bast—                     |
| 1. Parenchyma.  |                             | 1. Parenchyma.            |
| 2. Prosenchyma.   |                             | 2. Prosenchyma.           |
| 3. Vessels, dotted,<br>spiral, annular,<br>etc.                 |                             | 3. Vessels (sieve-tubes). |

Numerous anomalies occur in the structure of stems, perhaps the most remarkable being exhibited by the wood of conifers, which consists entirely of prosenchyma, the fibres bearing characteristic markings known as ‘bordered pits.’

To woody fibre we are indebted for great part of our cordage and textile fabrics, including the very finest of them, as muslin and lace. Reduced to pulp, it is used for manufacture of paper.

A kind of factitious or artificial wood, called *Bois duré*, used for making ornamental articles, is formed of sawdust, heated to a high temperature, and subjected to very great pressure. Its compactness and hardness exceed those of wood itself. Another kind is made by mixing blood with sawdust, and compressing. Some kinds of costly wood are imitated by mixing their sawdust with glue, and casting the mixture into the desired shape in molds. For various mechanical operations on wood, see **WOODWORKING.**

## WOODWORKING.

**WOODWORKING AND WOODWORKING MACHINES:** operations and appliances by which wood is adapted to the various uses of house and ship carpentry, joiner-work, cabinet-making, etc. These operations include the squaring and cutting of timber, planing, jointing, chamfering, molding, bending, gaining or mortising, tenoning, mitring, etc., all of which were formerly performed by hand, but now largely by machines, many of them of great ingenuity of construction and nicety of execution. See **CARPENTRY**.

**I. SAWING.**—The Saw (q. v.) is an ancient and important implement for dividing hard materials by the action of cutting teeth, which form a narrow kerf as they disintegrate and remove a part of the material in the shape of dust. The ax and the chisel, also dividing tools, differ from the saw in this, that while they remove portions of the material on which they act, they do not disintegrate it along the line of their cut—that is, they produce no saw-dust.

Saws may be classified in different ways: (1) By their mechanical disposition; (2) by the material which they are used to cut; or (3) by the power employed in operating them. Saws of the first class may be further classified as (1) reciprocating and (2) continuous. Nearly all *reciprocating-saws* are straight-bladed, and may be considered either as strained (kept stretched by a frame or other device at each end) or as unstrained (which are naturally stiff or have their backs reinforced by a stiffening piece, or are used to cut on the pull stroke only, and therefore do not require great stiffness). The typical *unstrained* reciprocating-saw is the ordinary hand-saw, by which is meant any saw used in the hand only, as distinguished from one driven by machinery. In this class are the ordinary carpenters' saws for cross-cutting and ripping, and the joiners' saws for tenoning, mitring, etc., the first having no stiffening piece on the back (indeed it is usually thinner on the back than on the cutting edge), and the second being reinforced by a back piece to prevent sidewise buckling. Most of the ordinary hand-saws used in this country cut only on the thrust or push stroke. Of the hand-saws, the rip-saw—whose teeth are arranged with comparatively wide spacing, have a vertical face and considerable set—cuts best lengthwise with the grain, and in soft woods; the cross-cut type—distinguished by smaller and more equilateral teeth, by closer spacing and less set—works best across the grain, in soft woods, and in hard lumber. Another type of unstrained saw is the muley- or mulay-saw, usually employed for ripping logs. It is always power-driven and cuts on the pull stroke only. When used for cross-cutting, it becomes a drag-saw. The use of blades strained by being held by both ends in a frame, or by some other equivalent device, permits employment of thinner blades, and practically abolishes difference between the push and the pull stroke. Strained reciprocating-saws are of all sizes from the small hand fret-saw, used in ornamental woodwork, and the metal-cutting or hack-saw, to



the ponderous affair used in saw-mills to square logs or to divide them into boards or planks. These saws may have in the frame either one blade, or many placed parallel so as to make several kerfs at once. The latter arrangement is called a *gang*. The jig-saw is suitable for working both outside and inside, and may have either a stationary or a tipping table. In the best makes the guides are adjustable, and may be varied in height to suit the thickness of the work; and the strain may be varied to suit the length of the saw. The machine is usually started and stopped by a friction clutch without belt-shifting, a brake stopping the crank-disk the moment the clutch is released. The gate-saw machine has a very wide and light sash or gate, reciprocating in vertical guides and bearing one narrow blade having a stroke of about five inches, with a 14-inch saw; working stuff six inches thick. This is for very wide material.

Of *continuous* or *continuous-acting* saws (i.e., saws which cut without alternation of stroke or speed) there are four principal classes: (1) The *circular-* or *disk-saw*, having the teeth on its periphery and in the plane of the disk; (2) the *barrel-* or *cylindrical-saw*, in which the teeth are on the edge of a hollow cylinder and project parallel with the axis of rotation; (3) the *band-saw*, in which a continuous ribbon driven by one pulley and driving another, after the manner of a belt for the transmission of power, bears cutting teeth on one edge; and (4) the *screw*, consisting of an advancing cylindrical or conical spiral, toothed on one edge in a direction radial to the axis of rotation. The *circular-* or *disk-saw* is of comparatively recent invention. It may be used either for ripping or for cutting almost any material, the teeth for each of these different classes of operation being of a shape, set, and spacing corresponding to those used by hand. Circular-saws are of all sizes from the tiny disk, no thicker than letter-paper, used in making the slits in gold pens and in gas-jet tips, to the six-foot disks, three-eighths inch and more in thickness, for ripping forest logs. Circular-saws may be arranged with only one on a shaft (or arbor, as the shaft is usually termed), or with two or more where parallel cuts are to be made; and in some cases two arbors are arranged parallel with the disks in the same plane, so that they cut a practically continuous kerf through much thicker material and with less waste than would be possible with only one saw. Where two or more circular-saws are on one arbor, they are called a *gang*; where two are borne on arbors lying in the same plane, so that they will cut a continuous kerf, the machine is called a two-high mill. Bevel circular-sawing machines may have either the saw or the table tip, as desired. Where the table is tipped, it can, in the best machines, be moved from the horizontal position through  $45^\circ$ , without altering the position of the saw with relation to the slot in the table. Where the saw is the adjustable element, the projection through the table may be altered to any desired extent, and the angle between disk and table may be from  $45^\circ$  to  $90^\circ$ . Circular-saw tables for ripping are usually furnished with ripping

## WOODWORKING.

gauges by which the width of the piece remaining after each cut may be accurately determined. In addition, it is well for many classes of work to have bevel gauges by which the angle of bevel to which a piece is slit may be predetermined and maintained. Circular-saw tables for cross-cutting may have cross-cut slides by which the length of piece removed may be fixed, and the work as well as the danger of feeding lessened. Saw-tables are now made almost exclusively of iron; and while many have their tops of wooden strips glued up, the best machines have accurately planed cast-iron tops, fitted with wooden throat pieces. In some circular-saw tables the saw-arbor is journaled at one end of a swinging frame provided with a handle and lock, by which the saw may be brought up through the table to any desired distance, according to the thickness of the material. Many circular-saw machines have boring attachments, a wood-auger being screwed to one end of the saw-arbor, the disk being allowed to remain if desired. Where there is a boring attachment, the saw-table has a bracketed shelf at right angles to the saw-arbor, on which the stock may be raised; and either the height of the bracket or that of the saw may be regulated by a screw and hand-wheel. This table has a sliding motion by which the piece may be brought up to the boring tool. Circular-resawing machines have vertical feed-rolls driven by strong gearing, and arranged so that, though ordinarily self-centring, they can be used for slicing, and set at any required angle for bevel-sawing. The swing-saw consists of a pendulum-like frame bearing at its lower end a circular-saw and journaled above in hangers. In the best makes the arm of the pendulum may be considerably lengthened or shortened to provide means for aligning the shaft, and for fitting to height both of the room and of the bench, as well as to diameter of the saw as it wears down. In most of them the saw-centre travels in a circular arc; but in one, instead of rising and falling in such a circular arc, the saw-arbor travels in a straight horizontal line, permitting a comparatively small saw to be used for wide and thick lumber, also enabling the use of a dado-head for grooving, gaining, rabbeting, tenoning, molding, etc. The parallel motion is obtained by a system of levers which compel the arbor to keep a right line. The bracket cut-off sawing-machine is a heavy cross-cut saw for cutting off large timbers used in car, bridge, and other heavy work. It consists of a long bracket which is bolted to a heavy plate, fastened to a wall or other suitable support, and can be raised and lowered to suit saws of different diameter. On this bracket the saw-carriage is mounted. The saw has a traverse movement over the table, through a hand-wheel. The table is a skeleton, bearing anti-friction rollers. The vertical cut-off saw consists of a stout column to the face of which is fitted a counterbalanced saw-carriage capable of being moved up and down by a treadle. The table has an adjustment to and from the column to suit different diameters of circular-saws, and a radial adjustment for angle-sawing. The same machine may be



used for gaining. Circular-saws may have their edges thicker than their centres, which is the usual custom and usually dispenses with the necessity of set; or they may have the edge thinner than the centre, as in veneer-cutting, in which the peripheral sectors are screwed or riveted to a central disk; or, lastly, as in those of small diameter and comparatively thin, the thickness may be the same all the way from centre to rim. As with hand-saws, these may have the teeth either spread-set or spring-set, according to the material. The cutting-speed of circular-saws varies. In ripping soft woods it may run as high as 13,000 ft. per minute at the rim, the teeth removing chips resembling those taken off by a chisel.

*Cylinder- or cylindrical-saws* range in size from those removing a disk an inch in diameter, used in the operation of trephining or trepanning the human skull, to those 2 ft. or more in diameter and 4 to 6 ft. in length, for cutting staves having curved sides. Their depth of cut is naturally limited by the length of the barrel, and this again by the degree of stiffness of the material of which the saw is composed, as one end must be in radial connection with the arbor.

The *screw- or spiral-saw* exists in but one class of machine, and that limited in application; its purpose being to cut the spaces between the tenons of the ordinary dovetail, as in box-making work. It is of English make and is mentioned here only for completeness of record.

*Band- or ribbon-saws* are coming rapidly into use, and would have been employed in greater numbers and for a greater variety of purposes had the makers of the blades been able to produce them of the length and quality to stand the exacting service demanded. As ordinarily made, the band-sawing machine has an upper and a lower pulley, of the same size; the lower one driven by a belt from any convenient source of rotary motion, and carrying an endless band or ribbon toothed on one edge, which serves the double purpose of dividing the stock and of driving the upper pulley. The pulleys (particularly the upper) are made as light as possible, so that when it is desired to stop the blade it may be done with the least practical resistance due to momentum. The lower one has a friction brake which may be applied to its inner rim-edge, so that when it is properly braked the only cause for continuance of motion of the blade is its own very slight momentum and the more considerable inertia of the upper wheel. Of course too sudden braking of the lower wheel would result in the band slipping on one or the other of the wheels; and as these are usually tired with leather or rubber to increase the driving-power, any such slipping would be apt to injure this tire, particularly if the teeth of the blade had any set. There is usually a device by which the shaft of the upper wheel may be canted so as to cause the blade to lead to one or the other edge, thus enabling the operator to keep it exactly in the central line of the tire of each wheel. There is also a provision by which, as the blade shortens by breakage and mending, the upper wheel may be brought

## WOODWORKING.

closer to the lower one. The tension of the saw is maintained in some machines by a spring and in others by a weight, the desired result being that the blade maintain at all times enough tension to keep it well to its work, and not enough to cause breakage; and that if a chip gets in between the saw and the wheel, there will be sufficient 'give' to prevent breaking of the blade. As the thrust of the stock in sawing, particularly if its rate of feed were high, would tend to throw the band off the pulleys, it is resisted by a back guide which is adjustable in height so as to be kept close down to the upper line of the work, which is usually fed along on a horizontal table. There are also side guides to keep the blade from swerving to one or the other side of the line of cut, as may be caused by a slight twist in the blade itself, or by an irregularity of motion of the piece being fed in, or by a knot, a soft place, or a hole in the material being sawed. Some band-saw guides take the pressure of the saw against two strips of steel held in place by a spring which enables them to be shifted from time to time. Others receive the thrust of the blade against cylindrical steel rollers which turn with the motion of the band; others, again, receive it on the bevelled edge of a hardened steel roller, the intention in using this form being to prevent grooving of the roller from use. Any rolling guide lessens the liability of the blade to crystallization. The rolling guides have the advantage that with them there is no danger of upsetting the back edge of the saw-blade. For heavy stock the table is supplied with rollers, as in some planing-machines. Logs, when sawed on a band-machine, are given their feed by a carriage, as in the case of the circular-saw. For a long time after the introduction of the band-saw it was used only in small sizes and for thin work, and especially for sawing ornamental patterns from several thicknesses of wood at once; but as the blades have been improved in quality and in size, and as users of the machine have understood how to handle them and to prevent accidents to the blade, to the material being sawed, and to the operator, the machines have been put to heavier and more important work, until now bands 60 ft. in length and 8 in. wide, travelling 4,000 ft. per minute, are at work almost in the backwoods, working into beams, planks, and boards the giants of the primeval forests. One make of log-band saw-mill has a log-carriage running on anti-friction rollers, and side supports so arranged as to secure an even thickness of the last board. There are rests at the same distance apart as the side supports, giving a decided advantage over ordinary mills in edging up boards and splitting plank into scantling.

One specially desirable use of the band-saw is in resawing stock already sawed by a circular or other type of sawing-machine. The extreme thinness of kerf which the band makes renders it very valuable in this class of work. As fitted for resawing, there are vertical rolls which feed and guide the material to and from the blade, friction ~~on~~ the bed being lessened by rollers projecting but slightly



above its plane. These rolls may be arranged so as to split the material down the centre or to one side thereof, thus making boards of equal or of unequal thickness, as desired. For ordinary band-resawing such a machine takes blades down to 24 gauge and up to 6 in. wide, sawing 16,000 to 20,000 ft. per day and making a kerf of only one-twentieth of an inch. In some makes, strong springs hold the rolls on one side to their work and enable them to yield to inequalities of thickness or shape, while the rolls on the other side form a guide in perfect line with the saw, thus making the cut parallel with one side of the stock. A band resawing mill with 72-inch wheels, and taking in lumber 30 in. wide and 13 in. thick, will cut in the centre of lumber 10 in. thick, or on the side of lumber 8 in. thick, or will take in a timber 13 in. thick and cut 5 in. on one side and 8 on the other. Such a machine will cut 5,000 ft. per hour.

While in most band-sawing machines the blade runs between pulleys one of which is directly above the other, and the blade hangs vertically, there are others in which, for bevelled sawing, the blade is inclined to the vertical. This is for many reasons better than inclining the table, as in the latter case there are two difficulties—one the tendency of the stock to slide out of place (by reason of its own weight), the other the risk of long pieces striking the floor or ceiling in cutting bevelling across the grain. With a horizontal table this is not possible. Some of the machines with inclined blades are so arranged that the blade-angle may be readily changed by moving the journal-boxes of one of the wheels in a circular arc centred at the axis of the other wheel, thus preserving the distance between the wheel-centres and the tension of the blade.

There have been made a few band-sawing machines which have two blades, each running on a separate pair of pulleys, the cutting sides parallel to each other, so that they can cut stock with parallel sides and curved outlines. The distance between the blades is regulated by the standard of one of the machines being movable along the bed-plate, so as to approach or to recede from the other standard.

II. PLANING.—*Planing-machines*—or, as they are called in common with the corresponding machines for metal-working, *Planers*—have for their principal object the smoothing and truing of surfaces, which should usually be parallel to the bed of the machine, and consequently with the opposite sides of the same piece of lumber which is being operated on: see PLANE. In the production of such plane surfaces three classes of machines are employed: (1) Those having slicing cutters, which act in the same manner as, though on a larger scale than, the irons of the ordinary carpenters' plane; (2) those having rotating cutters on arms at the end of an arbor at right angles to the plane surface desired to be produced; (3) those having rotating cutters on an arbor at right angles to the line of passage of the piece, but lying in a plane parallel to that which is desired to be produced.

In the first and third types there must be knives as long (at least) as the width which it is desired to plane at that

passing. In the second, the tools are only cutters somewhat similar to those used in a lathe for the rough cuts.

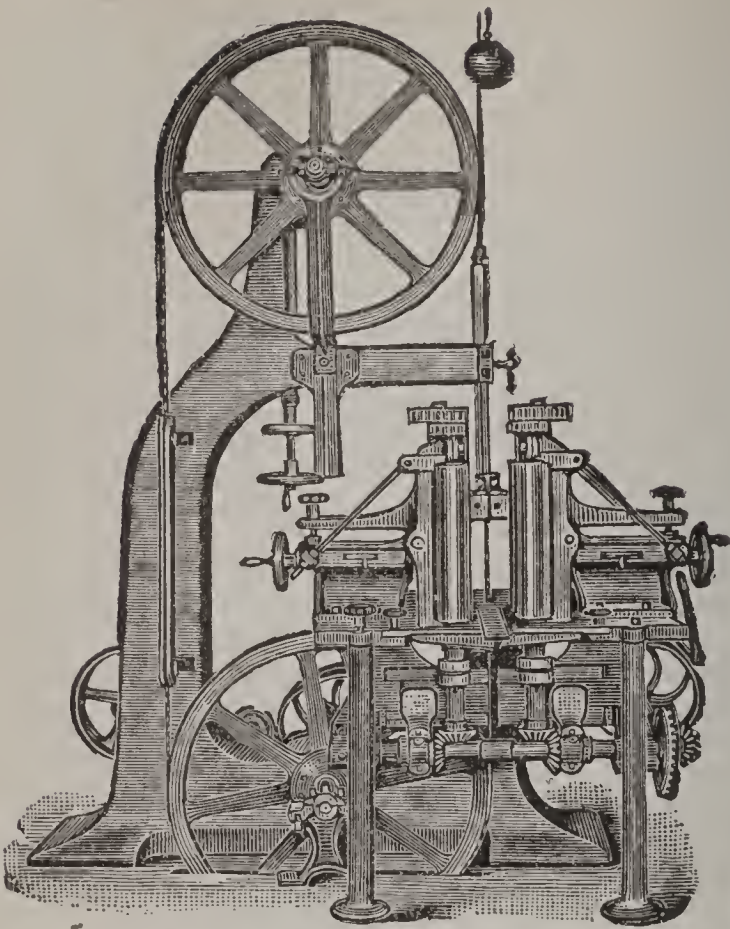
The first type of planing-machine is little used, except in Scandinavian countries, chiefly for working frozen lumber. There are several cutting blades placed obliquely to the length of the board, and each takes a slight cut a trifle deeper than the one before it.

In the second class, known as the Daniells machine, the material (usually heavy lumber) is fed along on a horizontal carriage, and the rotating cutters, which are borne on two horizontal radial arms at the end of a vertical arbor, project downward and cut in lines which would be circular if the material was not moving. While this type of machine does not do very smooth work, particularly at high feeds, it has the property of producing very true surfaces. It is usually employed in working timbers for car-building and other purposes where very long and heavy pieces are to be trued.

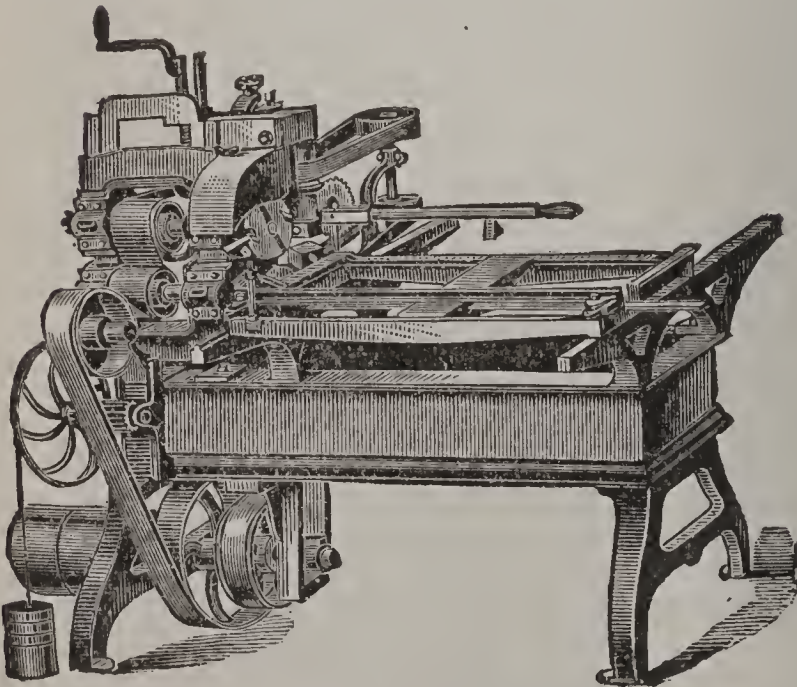
In the third class of wood-planing machines, ordinarily known as Woodworth or cylinder planers, and characterized by high speed of work, there is a rapidly rotating horizontal arbor bearing cutting knives and placed either over or under the piece to be planed. This may be passed along either by hand or by power, and may either be slid on a stationary bed or carried along (1) by a carriage to which it is rigidly attached, (2) by feed-rolls above and below, or (3) by an endless apron composed of stiff metal strips and travelling at right angles to the axis of the rotating cutters.

The first of these three modes of feed is not very common, though there are machines which use both the Daniells and the cylinder systems, and in which the piece being worked is always borne along by a carriage, whether the Daniells or the Woodworth head is employed. It has the disadvantage of requiring extreme length of machine and of taking up excessive room for the machine and the stick. For dimension-planing machines of the Daniells type it is well to have the feed-works on the under side of the main frame and below the table, to protect the machines from shavings and dust. A very desirable means of effecting the feed-motion is by friction disks, by which the rate of feed may be varied so as to move the table from 5 to 40 ft. per minute either way. Such machines are also best made with their tables in sections which can be attached together as the length of lumber may require. Such tables are often of iron, covered with wood, and in such case may be trued up by lowering the cutter-head and taking a light cut from the wood. The feed-roll system is the most common, although it has the disadvantage that if the upper surface of the timber is untrue, the material may be fed in improperly, the high side or edge being fed faster than the low. Where the stick is light, one roll will suffice to slide it along the bed or table, particularly if there are rollers imbedded in the latter; but ordinarily there is an upper and a lower roll, which grip the piece before the cutters strike it. These rollers may be fluted lengthwise, in order to give them





**Band Resawing Machine.**



**Tenoning Machine.**

a better gripping surface. Their action may be aided by feeding-out rolls, which grip the stock after it has been surfaced; though of course in this last pair the grooving or fluting must be dispensed with. To give increased grip without grooves, a rubber covering is sometimes used for the feed-out rolls.

In extra-heavy machines there are four heavy and strongly geared feed-rolls placed before and after the cutter-heads and close to them, so as to insure square work. In machines of modern design, the pressure feed-rolls are sectional, so that they can feed at the same time two pieces of unequal thicknesses. The feed-rolls are best driven with gears of greater diameter than the rolls themselves, thus making the strain on the teeth less than where both the gear and the roll are of the same diameter, and also insuring greater tooth-contact. Some planing-machines have an edge feed-roll for maintaining the lumber against the fence in a straight line while being worked. In some of the best machines for making flooring-boards there are six feed-rolls, the upper being smaller than the lower, securing easy entrance and delivery of the board as it passes in and out of the rolls, and avoiding the ridges sometimes seen on lumber, particularly where one board does not follow close to the one before it. In order that the same machine may work various thicknesses of stuff, the feed-rolls are geared together in such a way as to permit the distance between their centres to be varied without the teeth becoming unmeshed. For this purpose the kind of toothe-outline called 'involute' is best adapted. In many cases the pressure between the upper and the under rolls is effected by weighted levers, which admit of very rapid and effectual separation or approach of the feed-roll centres while preserving the proper pressure on the material to be moved. In surface planers it is well to have the pressure-roll so weighted that either end will work independently of the other, this being an advantage on unevenly sawed lumber. For wide surfacing it is well to have 'broken rolls' and divided pressure-bars, by which either one wide board or two narrow ones of unequal thickness may be planed. The machines are belt-driven, and their cutters run at a speed of from 4,000 to 7,000 turns per minute, according to the character of the material being worked, the softer woods permitting the highest rotation-speed and the fastest linear feed.

The third or endless-apron system is well suited for short pieces, which would require the feed-rolls to be inconveniently near the cutters, and which would also call for considerably more trouble on the part of the operator in engaging them between the feed-rolls.

With the cylinder system the cutters may be either over or under the stock, working either its upper or its under surface. Where the feed is by carriage or by endless bed, only the over-cutting system is permissible. Where it is by hand or by feed-rolls, it may be either over or under, or both at once. In this latter case one of the heads engages the stuff slightly in advance of the other. In all of the



systems the amount of cut may be regulated by screw or other devices, the journal-boxes of the cutter-arbors being adjustable up and down to an extent, and to a degree of fineness, to suit the demands of the operator and of the service, in the matter of depth of cut and thickness of material. In some endless-bed machines the bed or apron is composed of slats which are driven by sprocket-wheels which move the bed by the slats and not by the links which connect them. Some heavy endless-bed surfacers have delivery-rolls after the lower cylinder, feeding the lumber entirely away from the machine, and helping to relieve the strain on the travelling bed when feeding heavy lumber.

The advantage of the carriage-feed system is that the material is guided and governed by conditions entirely independent of its own surface, size, or shape.

In the best grades of cylinder-planers there are chip-breakers whose action is to keep the lumber from splintering. Usually the knives are parallel with the axis of the arbor which bears them, being slotted, and bolted on to a flat-sided head. In this case the marks which they make (as shown most plainly by deep cut and fast feed) are at right angles with the length of the stock. In other machines the knives are helical, thus making a draw-cut from one side of the piece to the other. This has the advantage of doing very smooth and even cutting, but the knives are difficult to sharpen, except by rotating emery or corundum wheels arranged to act on them without requiring them to be removed from their arbor.

Many planing-machines of the cylinder type have from two to four sets of cutter-heads, in the latter case dressing the material on all four sides; the side-cutting knives usually attacking it after those which work it on the upper and the lower surfaces. For flooring-boards there are usually but three sets of knives, dressing the stuff plane on one side, and working a tongue on one edge, and a corresponding groove on the other. In some machines the upper side is planed first, in others the lower; the latter method seeming to the writer preferable, as by it a smooth and true surface is prepared for the timber to move on while the other three sides are being planed. In some planing- and matching-machines the matcher-frames and spindles are dropped down to change from working flooring to plain surfacing; in others the alteration is made by removing the matcher-heads from the spindles, thus leaving the matcher frames and spindles always in working position and well supported, and keeping the boxes and journals in good condition. A jointing-machine for piano-work has a horizontal table bearing the piece, one side of which is to be made perfectly true; and the cutters are borne on the face of a disk with vertical face, so that the action of the machine is in effect that of a Daniells planer with horizontal instead of vertical cutter-head arbor. In some flooring-board planers the beading is done with a tool on the same arbor as the planing-knives, or by working the latter to the proper contour to perform this operation; but in the best machines the beading on both top and bottom is done

with separate cutter-heads, so that knives for beading and working 'novelty siding,' or making two floor-boards of one piece, can be placed at any point. The beading cutter-heads and matcher-heads are best placed between the first and the second pair of rolls, partly because, if the beading-cutters follow the surfacing-knives, they make a rough or ragged beading, and partly because, if the matching-heads are after the surfacers, and the board is not held as firmly as it should be to assure good matching and beading, one pair of smooth rolls will be inadequate to feed or deliver the board from the machine; also because, if the gauges are set a little too tightly when matching, the lumber will show the marks. In some machines the beading attachment is mounted in the pressure-bar over the under cylinder, allowing the depth of the bead to be gauged from the surface of the board. It is considered by some makers best that the pressure-bars should swing eccentrically to the cutter-bits, thus doing away with the chance of striking them. The 'buzz'- or hand-planer having a horizontal-axised cutter-head projecting slightly above a horizontal table and fed only by hand, has, in the best forms, a table parted at the cutter-head and adjustable, so that both parts may be in the same horizontal plane, or either may be raised above the other. Whether the two parts of the table are in the same plane or not, their edges remain close to the knives, irrespective of the depth of cut to which they are set; and in some, by a special adjustment, the tables can be set to plane slightly hollow; so that when work is glued up it will be extra tight at the ends and less liable to open. Such machines are usually provided with an adjustable square-and mitre-gauge; and should have a pressure-piece with a finger-protector for pressing stock against the gauge. The buzz-planer with the cutter-arbor and the adjustable table-tops vertical instead of horizontal, becomes a desirable edge-jointer and molder, enabling straight molding, tonguing, carving, jointing, etc., to be done without rigging up special guides; but its most important use is jointing the edges of wide boards, and in squaring up stock of various width and thickness. It is well that surfacing-machines for wide material have the cutter-arbor belted at both ends.

III. MOLDING.—The *Molding-machine* is but a development of the cylinder-planing and matching-machine, the desired outlines and cross-sections being given by knives of proper contour, borne on rotating cutter-heads, and arranged to work the material on one, two, three, or four sides, as desired. The feed is usually by rolls; those for feeding-in having, if necessary, corrugations or roughnesses to give them a good grip, and those for guiding the material out, and for relieving the feeding-in rolls, often being rubber-covered to prevent their damaging the surface of the finished molding. Where the molded surface is worked by cutters on horizontal arbors, the latter may be supported at both ends—in which case the machine is said to be an inside molding-machine; or at only one end, the other being free—in which case it is said to be an outside molding-machine. The latter arrangement is convenient, but, of



course, not quite rigid. Molding being ordinarily narrower than material which is to be planed flat, convenience of arrangement and use has made many molding-machines of the 'outside' type.

Two types of cutter are used with these machines: (1) One of even thickness throughout, and of such contour as will, at the desired angle of presentation to the material, make the required contour of molding. This kind is difficult to sharpen so as to preserve the proper outline. (2) Cutters so grooved or hollowed on one side that by grinding them at a uniform bevel the desired contour may be given.

To effect economy in material, moldings are usually worked out of stuff of as little area of cross-section as will permit the required depth of concavity, so that the material fed to molding-machines is often triangular or trapezoidal in cross-section. This, of course, increases the difficulty of feeding the material, and of laying out the knife-outlines.

The edge-molding machine or shaper usually has a horizontal table through which projects a vertical spindle to which may be fitted fly-cutters of any desired outline, which work to the required contour the edge of the piece presented to them. Such a machine may do either straight or curved work, as for picture-frames. In all cases the height of the spindle above the table should be adjustable. An edge-molding machine which will also make corner blocks, rosettes, and dovetails has a vertical spindle holding a cutter, which projects through the centre of the table-top; the stuff may be clamped in a cage which has traverse in all directions in the horizontal plane, so that rosettes may be cut. The same machine will work patterns on long strips.

So great is the precision of work attained by these machines, both planing and molding, that for most purposes no sand-papering nor other dressing is required; the speed of the cutters being so high, and their cuts so close together, that they produce a practically continuous smooth surface. Where, however, it is required to give a specially smooth and glossy surface, sand-papering machines are employed (see below).

IV. GAINING.—*Gaining-machines*—or *Gainers*, as they are often called—are used for making rectangular grooves in the face of timber, usually at right angles to its length, and usually also extending all the way across its width. While these 'gains' are generally comparatively narrow, they may be, as in the case of passenger-car uprights, recesses to receive a truss-plank of considerable width, being, in the instance just cited, wider than they are long; width being counted (in the case of right-angled gaining) in the direction of the length of the piece, and length being considered as in the direction of the cut, or at right angles to the length of the piece grooved.

Gaining (also called grooving and dadoing) may be effected by two classes of tools: (1) Rotating cutters having a cutting width equal to that of the desired groove; (2) thick saws set at an angle to their axes, so as to have a wobbling

## WOODWORKING.

motion, and which make a shallow kerf wider not only than the thickness of the plate of which they are made, but also than any degree of set would cause them to make. The former type is the more common.

In gaining-machines either the cutter-head or the stock may be given the desired traverse. Where the work is light, it is usually more convenient, and gives truer work, to move the stock instead of the tool; but where it is very heavy, as in car-work, it is better to give the cutter-head the motion, and not to move the stuff after it is clamped for each cut. Where several gains of the same width and depth, and equally spaced, are to be made, it is well to have stops by which the distance between them may be regulated, and to feed the work (or the cutter-head, as the case may be) across at each setting. For light work the cross-feed is by hand; for heavy work, by power. Where many gains are to be made close together in one piece, it is well to have two or more cutting-heads. To avoid the necessity for a great number of cutters of different widths, often fractional, there have been devised a number of extensible or variable gainer-heads, in which there are two or more sets of cutters, which may be so arranged that all of them cut to their exact width, in the same line, or else that some of them cut one-half of the width of the gain and others the other half; so that cutters an inch wide may make gains of any fractional width from one inch to two, inclusive. A dado-head, grooving-head, or gaining-head is best made with scoring-knives to clean the way for the cutters, thus making 'sweeter' work than where the flat or routing cutters which work between the scorers are their own side gauges. For these last there may be substituted formed knives for moldings, pilasters, and other work, as well as for tenoning, rabbeting, etc.

V. TENONING.—The operation of *Tenoning* may be performed by two separate classes of machines: (1) Those using circular-saws, which cut, from the stick, blocks of such size and shape, and from such places, as will leave the tenons standing where desired; the only disintegration of material being along the kerf-lines. (2) Those having rotating cutters, which completely disintegrate the material cut away. The first class of machines usually consume less power than the other, but as the walls of the kerf left by even the finest-toothed and sharpest saw, with the slowest feed, are not so smooth as the cut of a rapidly rotating knife, tenons made by saws are not so well finished as those made by cutters. Further, saws cutting away blocks are limited in their action to single tenoning, while cutters may be made to leave standing two, three, or more tenons, of different lengths, thicknesses, widths of shoulder, etc.

For doing ordinary single tenoning by circular saws the machines usually have two saws on the same axis, their distance apart practically representing the thickness of the tenon to be left. The end of the stick being passed over these, there are made two parallel kerfs representing the sides of the tenon; then two saws on parallel arbors, their disks lying in the same plane, and their rims at a distance apart




representing the thickness of the tenon, remove the outside blocks and leave the tenon standing. For such work the thickness of tenon can be regulated only by varying the thickness of the distance-piece between the parallel saws. The width of the shoulder on each side of the tenon may be varied without changing the tenon-thickness, by presenting the stick more to one side, or to the other; thereby making one shoulder or the other the wider. Where it is desired to make one cheek of the tenon longer than the other, the two cutting-off saws cannot be in the same plane, but must be moved so that both their arbors and their disks are parallel, but the latter are not in the same plane. In machines of this type, while the length of tenon cannot quite equal the distance from the collars of the slitting saws to their rims, and the width of the shoulder cannot quite equal the same distance on the cutting-off saws, this limitation is no bar in practice.

Tenoning-machines using saws for removing blocks may make tenons having their sides parallel with those of the stick, and their shoulders at right angles to the length of the stick, by presenting the stick at the desired angle to the disks of the slitting-saws; and if it be desired to make the shoulders oblique, with the sides of the tenons either parallel or inclined to the length of the stick, this may be done by presenting the stick at the desired angle to the cutting-off saws. In making the ordinary single tenon by rotating cutters, the latter may be mounted and presented in various ways. One way is by cutters having their axes at right angles to the length of the stick, the width of the cutter properly being equal to or little greater than the desired shoulder-width. With one cutter, one face of the tenon may be finished at one passage, and the other finished by a second cut; or two cutters may be mounted on the same axis, at a distance apart equal to the desired tenon-thickness, and the work done at one pass. One machine for forming single or double tenons on both ends of long pieces without turning them about has a horizontal cutter-head arbor at right angles to the table on which the stick is clamped. This head may be raised and lowered, so as to pass through the end of the stick while it is clamped at one end of the table; the stick then being slid lengthwise and again clamped, the head is traversed in the opposite direction to that which it was given in making the first tenon.

In another type of cutter-head machines, the head is on an axis parallel to the length of the stick, but not in line with the stick itself; and instead of comparatively thin cutters, such as those required in the type just described, there are, properly, knives of a width equal at least to the length of the tenon, their length, also, being equal at least to the width of shoulder. With one axis bearing one cutter-head, one side of the tenon may be finished at one pass, and the other may then be done by another pass. By having two arbors, each bearing a cutter, and placed parallel to each other and to the length of the stick, the single tenon may be cut by one pass, each head making one side. It is evident that cutter-head ma-

chines having arbors parallel to the length of the stick cannot make double or treble tenons; but that by increasing the number of cutter-heads on the single arbor placed at right angles to the length of the stick, any desired length, width, or spacing, or double, treble, or quadruple tenons, may be secured. Inclined tenons may be made on either type of cutter-head machine, by varying the angle of the cutter-arbor in relation to the length of the stick. A strong tenoning-machine with a carriage mounted on rollers, for heavy work, has for single tenoning two horizontal spindles; and where double tenoning is desired, a vertical spindle with cutters acting between the others is added.

VI. MORTISING.—*Mortising-machines*.—Mortises to receive tenons may be made by two kinds of tools, reciprocating and boring—that is, either by chisels or by augers. In some cases the boring tool is employed to remove most of the material, and the chisel is then brought into service to square the outline. For ordinary work which is not of great dimensions, there are employed stiff reciprocating chisels which start at one end of the mortise and work toward the other. The tools themselves usually are of  section above, the sides tapering away so as to leave the lower cutting edge only a single straight line. Such a tool will cut away the material without splintering at the edges. Some chisels of this type have a jagged or ratchet-like inner surface which enables them to withdraw the chips which they make, instead of packing them and clogging the mortise. While a chisel will work without the aid of any other tool, it is usually advisable, if the mortise is to be of any size, to leave the chisel as little work as possible to do, other than merely squaring and smoothing the walls of the hole.

Mortising-machines for this class of tool usually bear the work on a table which may be raised or lowered at will by the operator, and thus brought into or taken away from the cut of the chisel, which reciprocates vertically, positively, and continuously. The table also has sidewise traverse, so that the entire length of the desired mortise may be brought under the tool, and has in addition a forward and backward traverse to enable the tool to cut a mortise wider than itself. These machines are simple and can run at high speed. In some machines the stroke of the tool is variable; this being effected (1) by its attachment to a pitman, the rotating pin of which may be fixed at any desired distance from the centre about which it revolves, thus varying the length of the crank-arm; (2) by the use of a toggle, by which the chisel may be given either all or only a portion of the length of throw of the crank—this second class of variations being effected while the machine is in motion. Machines having a graduated stroke, the motion being produced by lengthening the connection between the crank-shaft and the chisel-bar, starting from a still point, do well in heavy work or where the table attachments are too heavy to be lifted by the operator.

In some machines the boring tool is made to do the prin-

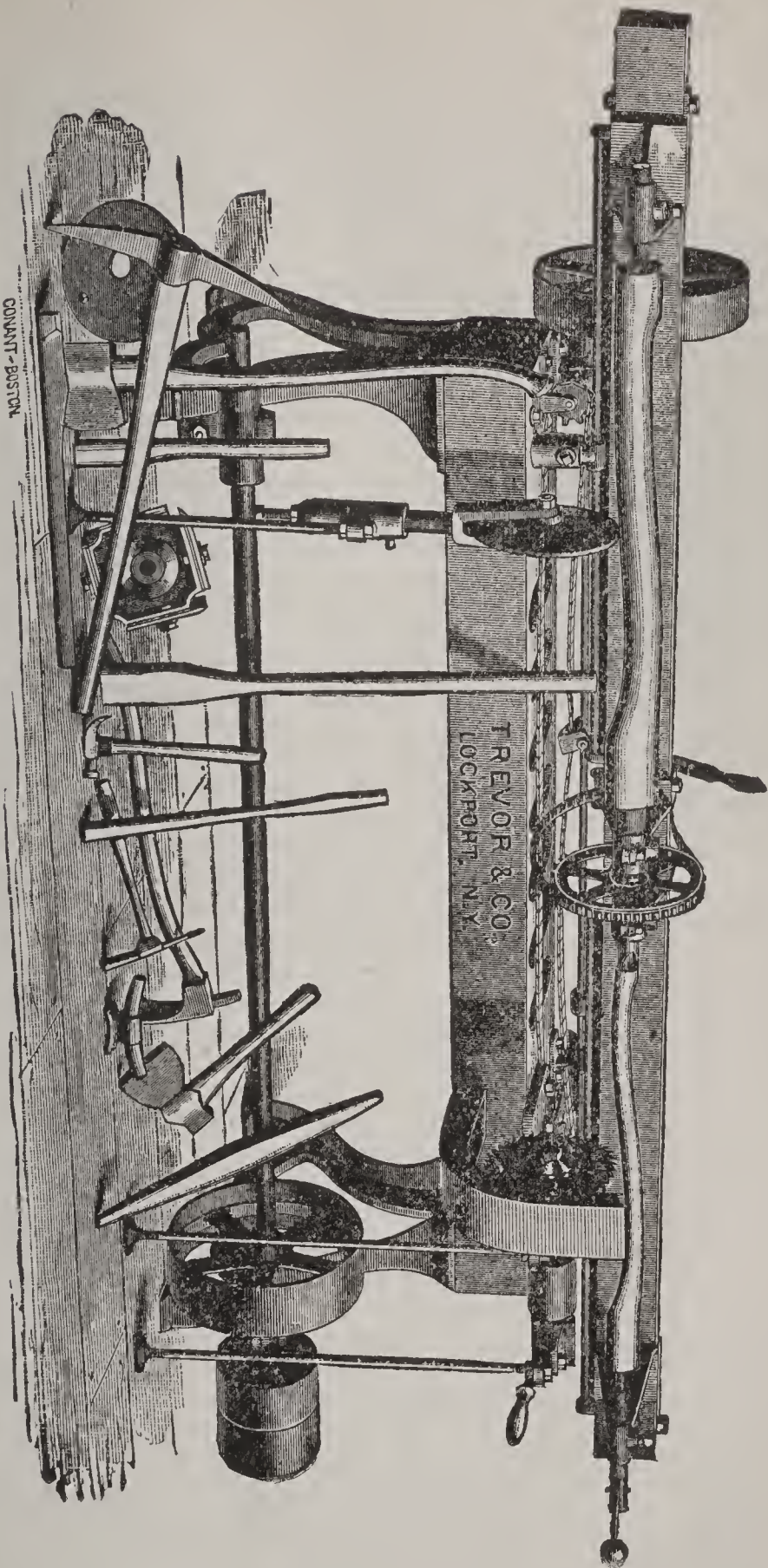


cipal part of the work, and instead of the chisel which cuts on only three sides there is employed one having a square outline, but each cutting edge of which is slightly concaved, so that it makes a draw-cut from each corner. Where, as is usually the case, the mortise has a larger area than that of this clearing chisel, each stroke of which leaves a finished surface, the material is traversed, so as by repeated cuts to clear the entire desired area, leaving the walls smooth and true by reason of the drawing-cut of the clearing tool. Machines in which the chisel-bar has a hollow chisel, and augers with progressive forward movement to the required depth of mortise, the action of the auger preceding that of the chisel and working the mortise to its full depth at each stroke, are best for heavy timbers, as in bridge and car work.

In some machines, instead of the greater part of the stock being worked away by making a succession of auger-holes, cutting only with their ends, the rotating tools cut principally with their sides, being in effect routing-tools; and in this case the material is given continuous traverse, so that the tool cuts from one end to the other of the mortise-lines. Those machines in which the mortise is formed by a rotating traversing bit, cutting on the side as well as on the end, are especially suitable where there are many pieces to be made exactly alike, as in chair-work. Blind mortises, or those which do not extend clear through the thickness of the material, may be made by any of the machines above described, but the bottoms of the holes will not be smooth unless there is used a special routing-tool; and even in this case the corners cannot be perfectly clear.

VII. DOVETAILING.—*Dovetailing* is a species of tenoning, but in dovetails proper the tenon has its free end wider than that which is attached to the stick. In the dovetail-joint there are usually a number of such tenons standing side by side on the side, edge, or end, of a piece, as a board; and usually the mortises in each piece are the exact counterparts of the tenons between which they are made, the mortises of one piece interlocking with the tenons of the other, so that the same cutting tools may be employed for the fully projecting tenon on one piece and the side-bearing tenons of the one with which it engages. This, however, is not always the case, as the end-tenons will often be quite wide, with narrow spacing, and the side-bearing tenons will be narrow, to correspond with the spacing between the end-tenons. Such tenons are produced: (1) by rotating cutters of the 'fly' type, having their free ends larger than those which are attached; (2) by the spiral- or helical-saw, briefly referred to under the head of Sawing (see above).

A species of false tenoning is produced by working on the end of one piece, parallel with its length, cylindrical pins or dowels around which the material has been routed away so as to leave an outline of a circular arc. The end of the corresponding piece is worked in a scalloped outline, the centre of each scallop being bored to receive one of the



CONANT-BOSTON

The "Blanchard" Lathe.



dowels which project from the end of the other piece. The dowelled parts are cut with a 'fly' cutter; the scalloping is done usually by side-cutting knives.

VIII. TURNING or LATHE-WORK.—While the Lathe is not so markedly in the lead in woodworking as in metal-working machines, yet in its various forms it has an importance which renders it nearly indispensable. Its principal use is the production of objects having circular cross-sections with symmetrical outline, though in its modifications it produces articles of any desired cross-section and contour.

In its original form, the principal feature—from which it takes its name—was a flexible lath or other piece of wood fastened at one end and having attached to its outer and free end a cord which was wrapped about the article to be turned round. This, being placed horizontally in the crotches of two vertical forked uprights, was given rotation in one direction by means of a cord attached to the flexible lath, and in the other by a similar cord from a treadle-piece. The application of a hand cutting-tool to a piece rotated in such manner gave it the desired form, every section being circular. From the motion given the piece while being so worked came the word 'turning.'

A development of this primitive turning-lathe was to attach the piece being worked to a head, which was given rotation by a cord and treadle, and cord and flexible lath; and later by a treadle and crank, driving a band-wheel from which a cord passed over a pulley on the rotating head to which the piece was attached; the other end of the piece being (in either of the two instances last mentioned) free to turn on a cone-centre or its equivalent. In all cases the tool was guided by a rest, which might be slid lengthwise with the axis of the piece to enable the tool to attack any desired portion of the length, and might also be approached to or drawn away from the axis of rotation to enable the piece to be worked to any desired diameter at any portion of its length. Improvements in the ordinary turning-lathe have been in the line of giving the live-head, or that to which the article is attached, variable speed, and driving it by power; also in the manner of 'chucking' or holding the piece. The first chuck was merely a centre-piece having a forked centre, the prongs of which engaged in the end of the piece to be turned. For some kinds of work, as ball-turning, this was impracticable, and the cup-chuck, by which the finished part of a sphere might be held while the rest was being operated on, was evolved. The hollow spindle, which permitted the turning of pieces much longer than the distance between the live- and the dead-centres of the machine, was an advance which has been appreciated by woodworkers everywhere.

The face-lathe, permitting the turning of articles of great diameter and short length, such as disks, holds the material on a face-plate which overhangs the frame of the machine, and by its use the only practical limit to the diameter which may be worked is the distance between the axis of rotation and the floor or other obstruction.

## WOODWORKING.

The gap-lathe, while not so common in woodworking as in metal-working, combines the features of the face-lathe with those of the ordinary type, having in the bed a depression or goose-neck by which long articles requiring support at both ends, and having considerable diameter at one portion of their length, may be turned.

In all the above-mentioned machines the tools are stationary, and the high cutting-speed desirable to give smooth cutting and large output is obtained by high rotation-speed of the material itself. This, however, has the disadvantage that the cutting-speed is greater at those parts of the object remote from the centre, than at those near the axis of rotation; and there are certain classes of work which cannot be done in this manner. A further development was the use of rotating cutters driven by a separate belt, and turning either in the direction of motion of the article being turned, or in the opposite direction, or lengthwise therewith; the cutters having high speed and the article itself turning but slowly, so as to present successive portions of its periphery to the cutters. In the Blanchard lathe (named after the inventor) the cutters have a high-speed rotary-motion only, and the material to be turned has a slow rotating motion, also a lengthwise traverse and an upward and downward movement which is governed by a former of the desired shape, though it may be larger or smaller than the article to be turned. The axis of rotation of the former is in line with the axis of the article, and both are in a movable frame. The former rests on a wheel, and, as it rotates, causes the whole frame to rise and fall as the inequalities of the surface of the former rest on the wheel, thus causing the copy to approach or recede from the cutters in an equal degree—a slow lengthwise traverse being kept up at the same time. Such a machine can turn out 200 axe helves per day, and can also turn gun stocks and more irregular articles having elliptical, oval or other non-circular cross sections. In the gauge-lathe, the material to be turned rotates at a high speed, while the knives have a comparatively slow lengthwise traverse, and the finishing knife has also an upward and downward motion, regulated by a pattern screwed to the bed of the lathe. This lathe will turn over 2,000 broom handles a day, and other articles having a round cross section. In the back-knife lathe the cutting tool is a long knife with its length diagonal to a rectangular vertical frame which has a slow vertical motion, the knife thus forming a shearing-cutter, acting with successive portions of its length on the rapidly rotating material; if the knife is given other than a straight cutting edge it will give a corresponding outline to the piece produced.

**IX. BORING and BORING-MACHINES.**—Machinery is applied to driving the usual types of boring-bits, for two reasons—the greater speed and range of work possible, and the greater attainable accuracy of the holes bored and of their spacing. In the mere application of power of turning a boring tool there is little or no invention required; but in the production of machines for doing special classes of



## WOODWORKING.

work rapidly and with precision, builders of woodworking machinery have distinguished themselves.

A very useful type of boring-machine consists of a single spindle bearing on its lower end a boring-bit, arranged with a lever so that it may be depressed to bore into work below it, and withdrawn by a spring when the lever is released. For piano-action work there is a type of boring-lathe (so called) which has a slide-rest with vertical, lateral, and lengthwise adjustment, and capable of being swivelled to any angle, and placed either lengthwise or crosswise on the shears. For end-boring car-sills and similar work there is used a radial reversible car-borer, which will bore at any angle in a horizontal plane, or, by proper adjustment, at any angle in a vertical plane. The boring-spindle runs in a revolving frame, and will reverse so as to bore in either direction, to right or to left, and can be moved to any angle up to  $90^{\circ}$ . A multiple- or gang-machine for boring a large number of holes at one operation, without laying them out, carries four to eight spindles, which run in frames gibbed to a connected gateway and vertically adjustable by a screw to each. There is below the machine a drum over which there wraps a continuous belt which drives all the spindles without the necessity of an idler for every one. When the spindles are set at the proper height and distance apart, no laying out of the work is necessary. A three-spindle vertical car-boring machine has horizontal traverse for the spindles; the timber is borne on a roller-table having geared rollers arranged to run in either direction, moving it either to right or to left. A three-spindle horizontal boring-machine has quick independent vertical-power adjustment, to avoid the frequent changing of augers; the timber is moved on a roller-table by a fluted roller turned by a hand-wheel. Some boring-machines, suited especially to mortising, and adapted also to rosette-cutting, have a horizontal spindle in a steel tube, with which it rotates and in which it slides, thus preventing the difficulty that arises from spindles which slide in the same bearings in which they rotate, of becoming smaller at one part than at another. One class of boring-machine has two horizontal spindles, which may be set in the same horizontal plane, or in a plane at any angle with the horizontal. Its table slides forward, backward, and sidewise. One of the bits is removed when only single boring is desirable. This machine may be used for both boring and mortising, producing mortises with half-round ends, using in this case a rotating tool which cuts with both end and side. A very useful vertical boring-machine has three spindles bearing different-sized augers, so that all the holes in ordinary framing may be bored at one handling and setting. The spindles are differentially geared as to speed and power, to suit large or small augers.

X. CARVING and CARVING-MACHINES.—There are three kinds of machine to which the name *Carver* is given: (1) Machines which merely rout in plane or approximately plane surfaces; (2) those which reproduce patterns of any desired complexity of outline and relief; (3) those which

## WOODWORKING.

as complicated turning, as in making spiral posts, plain or intertwined.

Machines of the first kind work with plain rotating tools gauged to cut the desired depth, and cut principally with their sides. Such tools are usually mounted on swinging jointed arms such as are employed in sand-papering machines, so that they may be presented to every square inch of the surface of the material. In this case the track cut by the tool may be entirely governed by the operator's eye or hand, or the tool may be compelled to cut in an outline determined by a former. Such machines are, strictly, routing-machines, but very little developed from those employed to work away to a slight depth the comparatively large areas of material in relief-engravings not desired to receive ink or make an impression.

Carving-machines of the second kind also employ routing-cutters, but these nearly always act in connection with a pattern which is best made much larger than the desired copy, and of metal—a tracing-point going over every portion of the area of the pattern, causing the rotating tool to cut to a greater or less depth according as it is raised to a less or greater degree by the protuberances of the original; and the operator is usually depended on to see that every portion of the area of the original is visited by the tracer, which of course necessitates that corresponding portions of the copy shall be made. Of course by this machine the material cannot be spoiled by carelessness of the operator, because the tool cannot be made to cut deeper in any one place than the corresponding depth on the original would warrant. Such machines are often furnished with several cutters, all governed by one tracer, and, if the pantagraph system is properly carried out, may make all the copies of one size, or some of one size and others of one or more different sizes.

The third kind of machine, for making 'twist-work,' will turn not only a spiral of circular, elliptical, or oval cross-section, but two such spirals intertwining, either parallel, tapered, or curved. In the best-known machine of this type the cutters are similar in shape and arrangement to those on variety-shapers, and are so held between collars that they cut from the outside in, making a smooth cut, even against the grain. They rotate in the same direction for cutting either right or left handed.

In this twist-machine (Pryibil's) the work is held between centres, as on a wood lathe, but the head-stock is arranged to turn slowly, as the bed carrying the heads is moved lengthwise by a hand-crank at the front of the machine. The rate at which the work rotates in relation to the travel of the bed, and which determines the pitch of the twist, is regulated by change-gears, much as on a machinist's screw-cutting lathe. The gears, which mesh with a fixed rack, are only for rotating the work as the bed is moved lengthwise. The rack is double (cut on back and front), and by placing the gear on one or the other side thereof, the twist is cut right or left handed. The relative speed at which the work turns makes it long or short pitch. The frame on



## WOODWORKING.

which the bed rests is so pivoted centrally to the main frame as to swing in a horizontal plane, but can either be fixed at any desired point or left free to swing, for an object explained below. Just back of the work, at the height of the cutters and above the pivot on which the frame swings, is a head carrying four cutters (two right and two left handed) similar to the bits for a variety-molder, and held by somewhat similar collars, but set at an angle so as to make a shearing cut from outside in, thus enabling cutting against the grain without splintering the work or making it rough. These cutters are carried on a spindle held in a frame supported by a horizontal shaft in the same horizontal plane as the centres carrying the work. This shaft is perpendicular to a line connecting the cutters. The spindle-frame can be swung around this shaft to give the spindle any desired angular position in a vertical plane, to enable the cutters to fit the spiral of the twist, either right or left. The centre of the cutter-head, however, never changes its position, being in the axial line of the shaft.

The spindle and its frame are balanced in all positions and can be secured at any desired point. They can be moved forward and backward, to and from the work, to give requisite depth of cut on work of various diameters. When a tapered shape is to be worked, a flat wooden form of the proper taper is arranged to move back the spindle as the bed moves lengthwise, and the bed is swung around, as before described, and fixed at the proper angle to fit the taper. The spindle-frame is weighted to keep it against the form. When curved or variable tapers are to be cut, two forms are required—one to move back the spindle, the other to vary the swing of the bed as the taper changes. When two or more cuts are to be made on a single piece, the work is revolved through a fraction of the circle by a dividing head independent of the lengthwise motion of the bed; then another cut is taken, and so on. Small sticks are supported in a wooden block bored to fit them, and through which the cutters cut to the work.

XI. VENEERING.—*Veneer-cutting machines* are of three classes: (1) Those employing saws, and with some of which, particularly with very thin sheets, the kerf-waste weighs more than the finished product; (2) those slicing the log or balk by long knives, which, of course, lose no material in this way, and which show the grain of the wood in the same manner as saws do; (3) those turning from the log (previously made perfectly cylindrical) a continuous ribbon extending from the circumference to a very small core, which is wasted only so far as veneer-cutting is concerned. With this last machine the pattern presented is different from that shown by knives and saws, though it possesses a beauty peculiarly its own. This machine, while wasting no stock in kerf, has the disadvantages of requiring much of the bulk and weight of the log to be turned off before the knives can work on it, and of limiting the width of the sheet in the direction of the log's axis. By the second system the width of the sheet is fixed by the width of the log itself. With the third class of machine the limit is only

in the length of knife which can be kept in order and properly worked. There are some machines which, while not applied to making veneer, or costly and beautiful woods for covering baser material, still have the same function—that of removing slices of wood—and the same methods of operation. Some of these are for making thin, flexible wooden sheets from which to make berry-boxes, baskets, and the like; and these are usually supplied with knives, by which the stock is cut into small sheets, sometimes of the exact shape required to make the desired article, and all ready to be bent into the required shape. A later development of the second class of veneer-machines is in its employment for cutting boards from logs. This machine, brought out 1891, takes a log of full size as received, say, from the raft, and slices it lengthwise into boards half an inch in thickness, and as wide and long as the log itself; the knife being a massive affair and fixed directly to the piston of a steam-engine. Of course such a machine as this can have charged to it none of the losses due to kerf-waste.

XII. SAND-PAPERING.—Each year the list of articles which may be finished by sand-papering and kindred machines as well as or even better than by hand, increases. At first machine-work was applied only to plane surfaces of considerable extent, and these were treated while in a horizontal position by rapidly rotating horizontal disks covered with sand-paper, and borne at the end of jointed arms which permitted the action of the disk to be extended to any part of the wooden surface and at the same time prevented local scoring. Such articles as ax-handles, etc., which had surfaces of but slight extent in one direction, and more or less irregular, were treated by endless leather or canvas belts coated with glue and then sprinkled with sand or emery, and allowed to dry; these belts being run between pulleys in the same manner as an ordinary driving-belt, and having sufficient flexibility to enable the work to be well done in concavities as well as on convexities of the surface. While these early sanding-disk and sand-belt machines are still used, perfected in detail, for large flat work, they have been supplemented by others in which are large horizontal drums but slightly projecting through suitable apertures in the table along which the work is fed. In the best of these machines the drums have lengthwise traverse as well as rapid rotation, thus doing away with scoring. In some machines there are two to four such drums, acting one after the other on the surface to be smoothed, each being clothed with a finer grade of sand-paper than the one before it, and the last being known as the polishing drum.

Another type which has supplemented the machine with a horizontal sanding-disk at the end of a jointed arm has two opposing vertical disks, the horizontal distance between which may be accurately gauged, and which are used to dress both sides of such articles as drawers, which may be finished to accurate gauge as well as to good surface.

In one type or sand-paper machines there are rubber-



covered tapered drums on which moistened sand-paper is slipped. The same horizontal spindle bears a horizontal drum covered in the same way with the paper, and projecting very slightly through an opening through the table. Sand-paper used on such a machine has every grain brought into contact with the work, and has better opportunity of being freed from dust than when used on disks. One type of sander has not only the horizontal tapering and cylindrical surfaces, but a vertical drum projecting through the table, so that both straight and curved work can be done, preserving square corners. The vertical drum has vertical motion so that the full face may be used on shallow work, and the formation of ridges or grooves be prevented.

XIII. DOWELLING.—One class of work of increasing use is for making dowels, or straight cylindrical rods, e.g., those used as hammer-sticks for piano-actions. One type has on small sizes a single L-shaped knife, and on large sizes one for roughing and one for smoothing the cut. In all the rod passes through a rapidly rotating spindle. In many there are feed-rolls for passing in the stock; and they should be capable of being instantly stopped to avoid a knot or other defect.

XIV. WHEELMAKING.—The wheelwright's province has been invaded by machines which do his work with a rapidity and precision leaving little, if anything, to be desired, and in most instances far surpassing hand-work. Not only are the principal parts of the wheel—the hub, the spoke, and the rims or felloes—each made by separate machines, most of them special, but they are assembled also by machinery.

For making the hubs there are required lathes which produce the general barrel-shaped form, boring-machines which make in it the hole to receive the skein, and mortising-machines which make in it the equally spaced mortises. The spokes are turned by automatic copying-lathes of special make, and tenoned and throated by machines for that particular purpose. The rims or felloes are either sawed out by band- or dish-saws, or, while subjected to the action of steam, bent to the required curve by powerful machines. They are mortised to receive the tenons on the end of the spokes. Both the spokes and the felloes or rims are smoothed by sanding-belts. The spokes are driven into the hubs by machines which simulate the action of a hammer wielded by the human arm, and are sawed to equal length, while they project from the hub, by machines specially constructed for that purpose. The rims or felloes are forced on and held in place by special machines.

## WOODWORTH—WOOF.

WOODWORTH, *wúd'wèrth*, SAMUEL: poet of the *Old Oaken Bucket*: 1785, Jan. 13—1842, Dec. 9; b. Scituate, Mass. After a press apprenticeship on the *Columbian Centinel*, and a short experiment with a weekly paper in New Haven, he settled in New York 1809; made new experiments in publications; attempted 1816 a romance history of the war of 1812; was one year, 1823-4, with George P. Morris (q.v.); made other publication ventures, and wrote much for the press; had some success with several operettas; and left a body of poetical works, in which a single lyric—*The Old Oaken Bucket*—achieved a popular success.

WOOD'Y, WOOD'INESS: see Wood 1.

WOO'ER, WOO'ING, etc.: see Woo.

WOOF, n. *wóf* [from *weave*, which see]: the weft or cross-threads in weaving; the thread that is carried by the shuttle and is woven into the warp or lengthwise threads; texture; cloth. WOOF'Y, a. -*ī*, resembling the woof; having a close texture.



## WOOL.

**WOOL**, *n.* *wúl* [Goth. *wulla*; Icel. *ull*; Dut. *wol*; Dan. *uld*; Ger. *wolle*, wool: L. *villus*, shaggy hair: Gr. *oulos*, woolly]: the soft fine curly hair which covers the sheep and some other animals; any fine fibres resembling those of wool—the difference between *wool* and *hair* is, that the former is capable of felting on account of its rough edges, while the latter is not. **WOOLED** *a.* *wúld*, having wool, as *fine-wooled*. **WOOLEN**, *a.* *wúl n.* made of wool; consisting of wool; pertaining to wool; in *OE.*, behaving like a rough-dressed peasant; coarse. **WOOL'LY**, *a.* *-lǝ*, resembling wool; clothed with wool or with a down resembling it. **WOOL-LINESS**, *n.* *-nēs*, the state or quality of being woolly. **WOOL'-COMBER**, one whose business is to dress and comb wool. **WOOL'-DYED**, *a.* dyed in the form of yarn or wool before being made into cloth. **WOOL'FELL**, a skin which still retains its wool. **WOOL'-GATHERING**, *n.* idle indulgence of the imagination, causing neglect of present matters: **ADJ.** indulging in idle dreamy fancies; listless. **WOOL'-GROWING**, *a.* producing sheep chiefly for the sake of their wool. **WOOL'-GROWER**, a person who raises sheep chiefly for the production of wool. **WOOL'-PACK**, a bag of wool weighing 240 lbs. **WOOL'SACK**, a sack of wool; in the *house of lords*, the seat of the lord chancellor, composed of a large square bag of wool covered with red cloth—introduced during Elizabeth's reign as a memento of an act which had been passed prohibiting the export of wool, then the main source of the natural wealth of England. **WOOL'-SORTER**, one who sorts wool; specifically, one whose business it is to assort different kinds of wool according to their fineness, length of fibre, etc. **WOOL'-SORTER'S DISEASE**, a virulent acute malady occurring among wool-sorters and other workers in the wool or hair of animals which had been affected with splenic fever; a form of Anthrax (q.v.). **WOOL'-STAPLE**, a city or town to which wool was brought for sale at the king's staple (see **STAPLE**); the fibre of wool. **WOOL'-STAPLER**, a dealer in wool; one who sorts wools for the different kinds of manufacture. **WOOL'WARD**, *ad.* in *OE.*, clothed in wool or with wool next the skin, as to go *woolward*, to wear uncomfortable clothing next the skin, hence to do penance. **WOOLEN-DRAPER**, a dealer in woollen cloth. **WOOLENS**, *n.* plu. fabrics made of wool or of a mixture of wool and cotton.

**WOOL**: fine, soft, curly variety of Hair (q.v.). The term hair is applied, in ordinary language, to a smooth, straight-surfaced filament like human or horse hair, without serrations of any kind on its surface. Wool, on the other hand, is always more or less waved, as in fig. 1; besides which, externally each woolly filament is seen under the microscope to be covered with scales overlying each other, and projecting wherever a bend occurs in the fibre: see fig. 2, in which one of the leading varieties of wool is shown both in its natural state (*a* in outline, and *b* complete) and after it has undergone the process of carding (*c* in outline, and *d* complete), in each condition both as a transparent and as an opaque object. On these minute points of difference the value of wool chiefly depends, es-

pecially with regard to the great variety of its applications. If each fibre were straight and smooth, as in the case of hair, it would not retain the twisted state given to it by spinning, but would rapidly untwist when relieved from the force used in spinning; but the wavy condition causes the fibres to become entangled with each other, and the little projecting points of the scales hook into each other, and hold the fibres in close contact. Moreover, the deeper these scales fit into one another, the closer becomes the structure of the thread, consequently of the cloth made of it. This gives to wool the quality of *Felting* (q.v.). By combing, or drawing the wool through combs with angular metal teeth, some of the scales are removed, and the points of many more are broken off, so that wool which has been combed has less of the felting property, and is consequently better

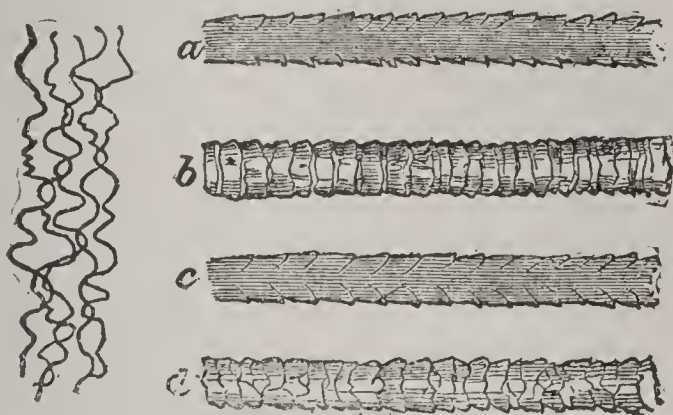


Fig. 1.

Fig. 2.

adapted for light fabrics; and yarn made of such wool is called *worsted*, and the cloths made of it *worsted goods*. But such is the variety of wools obtained by careful breeding and selection, that these differences can be got without combing, some wools being found to have naturally fewer serratures, and a less wavy structure, than others: these are consequently kept separate, and are called *combing-wools*; while those much waved, and with many serratures, are called *carding-wools*, from their being simply prepared for spinning by carding-machines. The serratures or points of the scales are exceedingly small, and require the aid of a good microscope to see them. They vary from 1,200 to 3,000 to an inch.

Wool is the most important of all animal substances used in manufactures, and ranks next to cotton as a raw material for textile fabrics. Its use as a substance for clothing is almost universal in the temperate regions of the globe.

Previous to 1791, British woollen cloths were made almost wholly of British wools: at that time the whole supply of that country could not have much exceeded 100,000,000 lbs. The merino wool of Spain then began to displace them in the best kind of goods, and the imports from that country reached their maximum 1805 (7,000,000 lbs.). Before 1820, German wool had begun to supersede the Spanish, and was imported largely till 1841. After that, the cheaper wool of the Brit. colonies to a great ex-



tent took the place of the German, and the German is now chiefly used for only the finest cloths.

W. varies in character according to the peculiar breed of sheep which yields it, also with the nature of the soil, food, shelter, and climate. In a wool of first-rate quality the fibres are fine, soft, elastic, sound, of good color, and free from deleterious or troublesome impurities: the commercial value of any sample depends, therefore, on the extent to which it possesses these properties. If it be a combing-wool, the value will depend also on its length of staple.

For technical purposes, shorn fleeces are divided into two classes—one called *hogs* or *tegs*, the other *wethers* or *ewes*. The former are the first fleeces shorn from the sheep, the latter are those of the second and succeeding years; but the meaning of these terms varies a little in different districts. The fleeces of yearlings are, as a rule, longer in the staple, and otherwise of superior quality to the wool of older animals. In countries where it is customary to clip lambs, the wool so obtained is called *shorn lamb's-wool*. Wool taken from the skins of slaughtered sheep is called *skin-wool* or *pelt-wool*, and is of more variable quality than fleece-wool, on account of its being obtained in all stages of growth.

As long-stapled wools are used for worsted goods, and short-stapled for woolen goods, the various breeds which yield these two leading kinds are naturally divided into the long-wooled and short-wooled classes of sheep. The Lincoln, the Leicester, and the Cotswold breeds are considered good types of the former; and the Down, the Welsh, and the Shetland breeds, of the latter. The following is a brief notice of the characteristic properties of the various British wools:

Of the 'long wools,' the *Lincoln* has greatly risen in value of late years: it is coarse, of great length, and silky in appearance, so that it is adapted for 'lustre' goods, in imitation of alpaca fabrics. *Leicester* wool is esteemed for combing: it is rather finer in the hair, but not usually so soft and silky in the staple as the Lincoln. *Cotswold* wool is similar to the Leicester, but somewhat harsher: it is not suited for lustre goods. *Highland* wool is long-stapled and of coarse quality, but known to be susceptible of great improvements. The practice of 'smearing' greatly depreciates its value. It is used chiefly for the coarsest kinds of woolen fabrics, as carpets, rugs, and similar articles, also for Scotch blankets.

Of the 'short wools,' the different breeds of Downs partake very much of the same characters, though soil and climate affect them. The *South Down* is a short-stapled, small-haired wool, whose longer qualities are put aside for combing, and the shorter for manufacture of light woolen goods, such as flannel. The *Hampshire Down* differs from it in being coarser and in having the staple usually longer. The *Oxford Down* exceeds the Hampshire in length and coarseness of staple. The *Norfolk Down*, on the other hand, when clean, is very fine and valuable. The *Shrop-*

*shire Down* is increasing in importance, and is longer in the staple and has more lustre than any of the other Down breeds. *Ryeland*s wool is fine and short; but the breed of sheep is nearly extinct. The *Welsh* and *Shetland* wools have hair-like texture, deficient in the spiral form on which depends the relative value of high-class wools. They are suited only for goods in which the properties of shrinking and felting are not required. Shetland wool is obtained of various natural tints, which enables it to be used for producing different patterns without dyeing.

Of the intermediate wools, *Dorset* is clean, soft, and rather longer, and not quite so fine in the staple as the Down breeds. The *Cheviot* has grown of late years in public estimation: it is small, fine-haired, of medium length, and suitable for woollen and worsted purposes, for which it is largely used.

Some of the British colonies are very important wool-producing countries, Australia in this respect standing far in advance of all other countries. Australian wool has in general a beautiful, short, silky staple, adapted for manufacture of soft, pliable, and elastic fabrics. All the settled districts of that continent are suitable for growth of fine-wooled sheep, and the increase in the flocks has been remarkable. The breed has sprung from three merino rams and five ewes taken out by Capt. M'Arthur 1797. The alpaca wool grown in Australia has been inferior; but this is attributed to rearing the animals too near the coast.

The wool of Cape Colony has been greatly improved by introduction of merinos, and exports are increasing rapidly.

Among imports from India, wool has become important, the quantity having risen from about 2,500,000 lbs. (1840) to 29,190,049 lbs. (1880); but the supply is rather fluctuating. A great deal of the Indian wool is coarse and hairy, and can be used for only low-class goods. The most costly of all wools is from the Tibetan goat, and is found next the skin, under the thick hair of the animal: from it the far-famed Cashmere shawls are made. The highest price of any quality which is sold is 6s. to 7s. (\$1.25 to \$1.75) per lb. in the native markets; but the maharajah of Cashmere keeps a strict monopoly over the best kind.

Turning to European countries, we note that Spain, native country of the merino, which formerly sent all the wool for the best English cloths, has allowed its quality to degenerate, and its quantity to dwindle away. The wool of Saxony, Silesia, and parts of Austria, which is obtained from sheep of the merino breed, is the finest produced in any country; and notwithstanding the lower price and nearly equal quality of the Australian, German wool is still employed for the finest broadcloths, some kinds of ladies' shawls, and a few other purposes. Great attention is given to breeding and rearing sheep in Germany, and large flocks are reared for their wool alone. In Austria the number of sheep is estimated at 45,000,000, and the annual yield of wool at 100,000,000 lbs., most of it being of fine quality, and all of which is consumed in Austrian



## WOOL.

manufactures. France produces a large quantity both of fine and coarse wool. In Italy the production of wool from mixed merino breeds has become a source of great wealth. Russia, as might be expected from its great extent, rears many qualities, from the finest merino to a very coarse kind. The wools of the remaining countries of Europe are of minor importance.

The wools of South America are attaining great importance; the exports are large (including alpaca, llama, and vicuña wool): see ALPACA. The wool of the alpaca is very fine, 6 to 12 in. long, of various colors, and suited for certain kinds of goods, noticed under WOOLEN AND WORSTED MANUFACTURES. S. American sheep's-wool is of inferior quality.

According to the report of the Secretary of Agriculture, 1903, Jan. 1, there were in the United States 63,964,876 sheep, valued at \$168,315,750. The states that had the largest number were Montana 8,932,311; Wyoming 5,826,150; New Mexico 5,677,156; Idaho 4,541,815; Utah 3,570,070; Oregon 3,569,754; Ohio 3,447,786; Michigan 2,465,221; California 2,365,884.

In 1874 the total annual import into Great Britain was 302,500,925 lbs.; (1880) 460,960,907 lbs.; (1884) 526,526,661 lbs. (value £26,517,920). Few articles of constant and general consumption have been subject to such fluctuations in money-value as wool has been: from 1872 the prices in Great Britain receded from 2s. 6d. per lb. with varying fluctuations, until in 1885 they reached the low rate of about 8½d. per lb.

Considerable quantities of wool are retained on the skins, and made into rugs or mats for house and carriage use: for this, skins of the very best quality are chosen, and it is necessary that the wool should be very long in the staple. After being carefully curried, the long silky locks of wool are dyed usually some bright color, and combed. The skins are pared to shape, and form handsome rugs. Large numbers of Astrakhan sheep and lamb skins, usually black, also are imported in the wool, and are dressed and used as furs—i.e., for personal wear; and some of the sleek lambs' skins for this purpose bring high prices.

The only important wool, or woolly hair, of animals other than the sheep (and not above mentioned) is mohair, or the wool of the Angora Goat (q.v.). It is a white silky wool, with average length of staple of 5 to 6 inches. The demand for it is recent, and it is used chiefly for some kinds of ladies' dresses: see WOOLEN AND WORSTED MANUFACTURES. The hair of camels, bullocks, common goats, and several furs also are used to some extent for manufacturing purposes.

## WOOLEN AND WORSTED MANUFACTURES.

WOOL, JOHN ELLIS: soldier: 1784, Feb. 20—1869, Nov. 9; b. Newburgh, N. Y.; son of a soldier of the revolution. He was studying law when the war of 1812 broke out, raised a company of volunteers, and was commissioned capt. in 13th U. S. infantry 1812, Apr. 14; distinguished himself, and was severely wounded, at Queenstown Heights Oct. 13; was promoted maj. of 29th infantry 1813, Apr. 13, and became brevet lieut.col. 1814, Sep. 11, for gallantry at Plattsburg. On the reorganization of the army he became col. and inspector-gen. 1816, Apr. 29; was sent to Europe 1832 for inspection of milit. matters there; had charge 1836 of the removal of the Cherokee Indians; was made brig.gen. U. S. army 1841; and at the beginning of the Mexican war served in fitting out and dispatching volunteer forces, to the number of 12 000 within six weeks. He was second in command to Gen. Taylor at Buena Vista, and was in full charge on the field before Taylor's arrival; was brevetted maj.gen. 1847, Feb. 23, for gallant conduct in that battle; and for his Mexican war services received a vote of thanks from congress and a sword of honor, as also a sword from the state of N. Y. At the outbreak of the civil war he saved Fortress Monroe by his promptness in securing reinforcements, and had command of the dept. of Va., then of the middle milit. dept., and later of the dept. of the east till 1863, Aug. 1, when he was retired. He was promoted maj.gen. U. S. army 1862, May 16. A monument to his memory has been erected at Troy, N. Y.

WOOLD, v. *wôld* [Dut. *woelen*, to move to and fro, to wind]: among *seamen*, to wind a rope round a mast or spar on a place where it has been fished or scarfed; to wrap a yard round in order to prevent it chafing. WOOLD'ING, imp.: N. the act of winding, as a rope round a mast; the ropes used for binding a mast or spar. WOOLD'ED, pp.

WOOLEN AND WORSTED MANUFACTURES: fabrics of wool and of worsted, and the processes by which they are made. The spinning and weaving of wool was practiced from an early period in Asia Minor, Greece, Italy, and some other countries. It is very probable that the first lessons which our ancestors received in this art were from the Romans after their conquest; but the origin of the manufacture as a great staple is generally supposed to date from the time of William the Conqueror, when some Flemish weavers came to England, and obtained the patronage of the queen. The trade fell off during the troubles of succeeding reigns. In 1331 it revived by another supply of Dutch weavers brought over by Edward III. In 1530 the introduction of the spinning-wheel gave new impetus to the trade. French workmen, driven to England by the revocation of the Edict of Nantes 1685, brought skill in making fine cloth, and from that time to the present it has steadily prospered—having shared, with other leading textile manufactures, the great advancement by the spinning-jenny, the mule, and the power-loom.

There are two great classes of manufactures using wool as a raw material: in one, carded wool is employed, and



## WOOLEN AND WORSTED MANUFACTURES.

the goods are called 'woolen fabrics;' in the other, combed wools are used, and the goods are called 'worsted fabrics.' See WOOL.

*Woolen Manufacture.*---As the articles on SPINNING and WEAVING (see those titles) are general, we here briefly state the chief stages in these processes of this manufacture. A fleece of wool is first sorted by experienced sorters into several qualities, as first sort, or 'pick-locks;' second sort or quality; third sort or quality; and so on. Sometimes it is divided into only three, sometimes into as many as six kinds. The 'scouring' is the next step, and consists in immersing the wool in an alkaline lye, which forms a soap with the natural grease of the fleece. This of course acts as a detergent, and cleans the wool thoroughly when it is washed in water. On the perfection of the scouring depends in great part the beauty of the dye. It is often dyed at this stage, and is then said to be *wool-dyed*; if not dyed till it is woven, the cloth is said to be *piece-dyed*. For some purposes it is dyed in the yarn.

Scoured wool, dyed or not, next undergoes 'wilying.' The 'willy' is a machine to cleanse the wool from dust and other loose impurities. In many cases, seeds with hooked scales like burs are so thickly entangled in the wool that it requires to be passed through a 'burring'-machine, and afterward examined by 'pickers:' this is especially the case with S. Amer. wool, including that of the alpaca. After this the wool is sprinkled with olive-oil, which renders the fibres soft, flexible, and better fitted for later operations. The next process consists in tearing open the matted portions, and separating the wool into small tufts by means of a machine called a *teaser*, *tucker*, or *devil*: this has a large cylinder studded with iron pikes, which performs from 1,000 to 2,000 revolutions per minute, teasing the wool as it revolves, and throwing it out like flakes of snow.

The two next operations are *scribbling* and *carding*, performed by two somewhat similar machines, for whose essential parts, see SPINNING. Each machine consists of a large cylinder surrounded by several small rollers, all covered with wire cards or brushes. These, acting like fine toothed combs, open out, mix, and blend the fibres into a uniform and continuous sheet or lap, in which state it leaves the *scribbler*; but in the *carder* the sheet is at length converted into small rolls, say from a quarter to half an inch in diameter, which are afterward joined together, and form the basis of the thread. In the next machine, called the *slubbing-billy*, these rolls are drawn out, slightly twisted, and, in short, half converted into yarn. The spindles upon which these *slubbs* or *slubbings* are wound pass them to the *spinning-mule*, where they are converted into finished yarn.

Improvements have made the operations of scribbling, carding, and slubbing continuous, mainly through the introduction of Apperly's patent feeder, and of a modification of the carding-machine called a *condenser*, which does away with the use of the slubbing-billy; so that what

## WOOLEN AND WORSTED MANUFACTURES.

with the older machines is three separate processes, with the newer may be regarded as only one. Each of the foregoing operations occasions a certain amount of 'waste' wool, which is worked up again into inferior goods. It was to such waste that the name *shoddy* was originally applied. In the spinning process, the warp yarns, having to bear the strain of the loom, are made in a different way from those for the weft, and are hardened with size.

The difference between woollen and worsted fabrics is due in great part to the mode of spinning the yarn for each. Yarn for woollen cloth is very slightly twisted, to leave the fibres as free as possible for the felting process; worsted yarn, on the contrary, is hard-spun, and made into a much stronger thread. On account of the feebleness of woollen yarn, it is more difficult to weave it by power-looms than either worsted, cotton, linen, or silk.

Woollen cloth is now woven chiefly by power-looms: see **LOOM: WEAVING**. When the cloth is taken from the loom, it has a bare look, and is called the *raw thread*. It must first be *brayed* or *scoured*, to remove the oil added to the wool before spinning, and the size added to the warp: this is done by immersing it in some ammoniacal detergent liquid, such as urine and hog's dung, and squeezing it between rollers, or beating it in the fulling-stocks, and then rinsing it in clean water. The cloth then passes to the *burler*, who removes any knots or burls, and helps any imperfections. The next process to which it is subjected is the *milling* or *fulling*, and is very important. In some mills this is still done by beating the cloth in the *fulling-stocks*, which are heavy wooden mallets, raised by wheels with projecting cams; but a newer *fulling-machine* has come into use, in which the cloth is felted by passing it in a confined space between heavy rollers. With either machine, a thick solution of soap is used, and in the fulling-stocks an ordinary broadcloth will take 60 hours to mill, but considerably shorter time suffices in the fulling-machine. The result of the operation is, that the fibres of wool become so interlocked—so thoroughly felted—as to leave no appearance of thread. The shrinkage of the cloth in the milling is sometimes nearly a half in the width and about a fourth in the length. Another scouring follows the milling, and after that the nap or pile of the cloth is *raised* by Teasels (q.v.). These curious thistle-like heads are set in frames, which are arranged upon a large cylinder—the whole apparatus being called a *gig-mill*. As the cylinder revolves, the spines of the teasels raise the nap, which is afterward cut by a process termed *shearing*. For this purpose, a cutting-machine with spiral blades arranged round an iron cylinder is used; and when it revolves, the spiral cutters, acting against a straight steel blade, shear off the nap of the fabric like scissors. The cloth is then boiled, or 'scalded,' to impart a lustre to it, and to prevent spotting with rain. After this it is dyed (if this is not previously done in the wool), and finally it is pressed between polished iron plates in a powerful hydraulic press. With respect to the dyeing of black



## WOOLEN AND WORSTED MANUFACTURES.

cloth, it may be as well to explain that the term *woaded colors*, so commonly used in the trade, originally meant that Woad (q.v.) was used in conjunction with indigo as the basis of the color—a combination which produces the best and most durable color. Of late years, however, the name has been applied to the color of the fabric when indigo itself has been used as its basis. It is only the finest cloths that are now dyed in either of these ways—logwood, a salt of iron, and galls being usually employed to produce a black.

Names are given to various kinds of woollen cloths according to the style in which they are finished, the special material of which they are made, and the purpose for which they are intended. *Broadcloths* are classed into 'super-fines,' 54 to 62 inches wide; 'mediums,' 54 to 58 inches; 'double-milled,' 54 to 56 inches; and Venetians, which are twilled fabrics, 54 to 58 inches. The general term broadcloth also includes the following varieties, which mostly have less highly finished surfaces—meltons, beavers, pilots, cloakings, china striped cloths, India cloths, elastics, lustrés, and union cloths which have cotton warps and woollen wefts. *Narrow cloths*, which average about 27 inches wide, include cassimere, a thin, fine, twilled fabric; doeskin, also twilled, a strong, smooth-finished, sometimes treble-milled cloth, now usually dyed black for trouserings; Tweeds (q.v.), which have very much taken the place of fancy doeskins; and several other varieties. Then there are special kinds both broad and narrow—e.g., army cloths, rifle cloths, police cloth, upholstery cloth, carriage cloth, coffin cloths, and many more. Flannels, blankets, and some shawls also are included among woollen goods.

The public taste has changed much of late years as to the finish of woollen cloths. Formerly a firm, close, and hard fabric, with highly dressed or glossy surface, was in demand; now a softer and more pliable finish, without gloss, is in favor. Some manufacturers think, however, that a soft, rich, elastic cloth is apt to lose in strength what it gains in appearance, and do not finish so highly as the English. The desire for fancy woollens is another marked feature of the taste of the present day, and compels manufacturers to expend considerable sums in preparation of designs and colors. It has also caused enlargement and development of the art schools in connection with the manufacture.

Of all the changes during the present generation in this trade, the most remarkable is the production of cheap cloths by the use of shoddy; though cotton warps also have done much in the same direction. Prepared shoddy is obtained mostly by tearing up woollen rags by a *swift*, with 10 or 12 thousand iron spikes on it, revolving inside an iron cylinder. Shoddy now enters to a greater or less extent into the composition of all but the very finest woollen cloths. It began to be used in the first part of the 19th c., but the prejudice against it is scarcely yet overcome. Nevertheless it has become so necessary, that to stop the supply might be to shut one-third of the woollen-mills.

## WOOLEN AND WORSTED MANUFACTURES.

The excellent finish now given to woollen cloths containing a large proportion of shoddy, and also cloths with cotton warps, is surprising; moreover, their cheapness has brought comfortable clothing within the reach of the humblest classes. Cloths with too much shoddy in them are easily torn; but if a judicious admixture of pure wool has been employed, they wear comparatively well. Formerly the only use of woollen rags was to make flocks for wall-papers, for saddlers' stuffing, and some minor purposes—the greater part being used as manure.

In the Brit. Islands the various branches of the woollen manufacture are extensively diffused. The principal seat of the manufacture of superfine broadcloth is W. England—Gloucestershire and Wiltshire especially—where it has existed for centuries. But Yorkshire is the great seat of the woollen manufacture, including all the kinds, Leeds and Huddersfield being the great centres: one-half of all the operatives in the woollen factories of the kingdom are employed in Yorkshire. For the woollen manufacture in Scotland, see TWEEDS.

In 1880 the United States had 35,192,074 sheep, and the wool clip of the year aggregated 155,681,751 lbs. For the manufacture of the various kinds of woollen goods (excluding shoddy) there were 2,689 establishments, which employed \$159,091,869 capital and 161,557 hands (males 75,459, females 66,814, children 19,284); paid \$47,389,687 for wages and \$164,371,551 for materials; and had products valued at \$267,252,913. The establishments by branches, and the value of their products, were: woollen goods 1,990, \$160,606,721; worsted goods 76, \$33,549,942; felt goods 26, \$3,619,652; wool hats 43, \$8,516,569; carpets, other than rag, 195, \$31,792,802; and hosiery and knit goods 359, \$29,167,227. The principal manufacturing states were: Penn., 654 establishments; Mass., 271; N. Y., 264; O., 146; Tenn., 106; and Conn. and Mo., each 102. The machinery included 7,581 sets of cards, 518 combing-machines, 2,254,996 spindles, 57,530 (4,776 hand) looms, and 14,769 knitting-machines. For the manufacture of shoddy there were 73 establishments, which employed \$1,165,100 capital and 1,282 hands; paid \$400,326 for wages and \$3,366,650 for materials; and had products valued at \$4,989,615.—In 1890 the number of sheep was reported at 43,431,136 (increase 8,239,062), and the wool clip 265,000,000 lbs. (increase 109,318,249). The imports were 105,431,281 lbs.; domestic exports 231,042 lbs.; foreign exports 3,288,467 lbs.; amount retained for home consumption 366,911,772 lbs.; and percentage imported 27.7. For manufactures (excluding shoddy) there were 2,503 active and 267 inactive establishments, which had \$320,417,304 capital and 221,087 hands (males 99,318, females 106,112, children 15,657); paid \$76,768,871 for wages and \$203,095,642 for materials; and had products valued at \$338,231,109. The establishments by branches, and the value of their products, were: woollen goods 1,312, \$133,612,827; worsted goods 143, \$79,194,652; felt goods 34, \$4,654,768; wool hats 32, \$5,329,921; carpets, other than

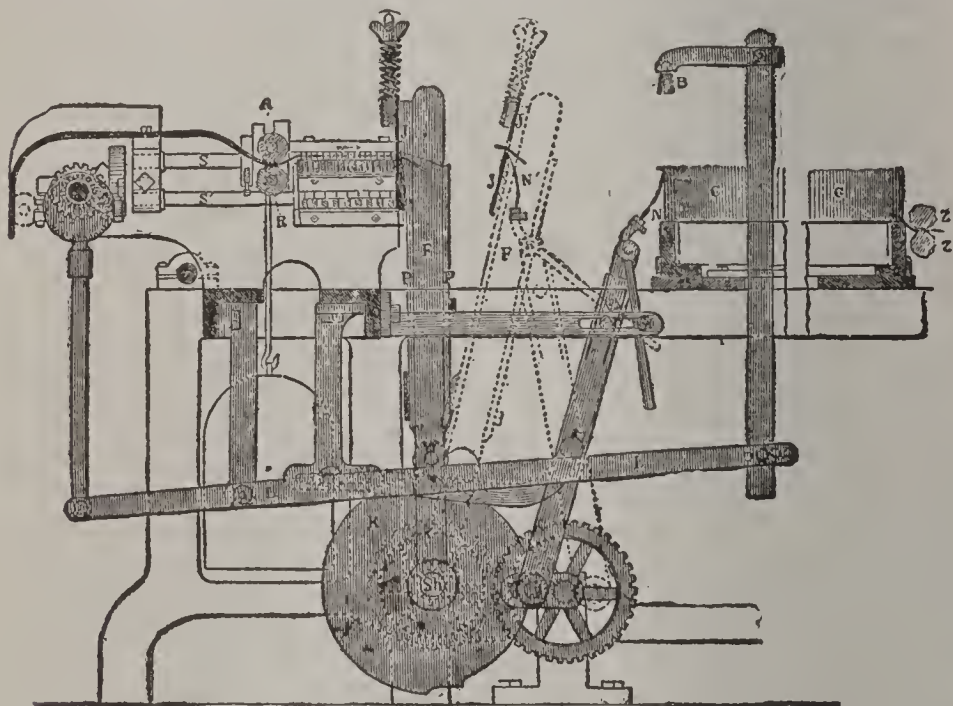


## WOOLEN AND WORSTED MANUFACTURES.

rag, 175, \$47,801,499; and hosiery and knit goods 807, \$67,637,442. The principal manufacturing states were: Penn., 706 establishments; N. Y., 342; Mass., 293; O., 115; Conn., 98; N. H., 90; and R. I., 85. The machinery included 8,200 sets of cards, 855 combing-machines, 3,286,280 spindles, 69,876 (3,105 hand) looms, and 36,924 knitting-machines. For the manufacture of shoddy there were 93 active and 4 inactive establishments, which employed \$4,091,207 capital and 2,266 hands; paid \$840,259 for wages; and had products valued at \$7,711,715.

According to the census of 1900 there were 305 establishments engaged in the manufacture of woolen and worsted goods in 209 cities, the woolen mills numbering 202, and the worsted mills 103. The combined capital was \$139,603,053; employes 66,799; amount of annual wages \$23,482,995; cost of materials used \$81,835,660; and value of output \$130,900,373.

*Worsted Manufacture.*—Worsted yarn, as above noted, is spun in a different way from woolen yarn. In the worsted the fibres are arranged as parallel as possible; in the woolen they are crossed in every direction, to assist



Wool-combing Machine.

the felting or milling of the cloth. For worsted the wool is first combed, formerly by hand-combs. The introduction of machines for combing wool has formed an epoch in the worsted trade. They are of two kinds—for combing long and for combing short wool. Heilmann's machine, made in 1846, was the first which did its work successfully. Lister's machine, now much used for combing long-stapled wool, is an improvement.

The remaining processes in worsted spinning closely resemble those for cotton: see SPINNING. The products of these are: 1. Fleece (Lincoln wool). 2. Combed 'top.' 3. Noils, or short wool. 4. Sliver from first drawing-frame. 5, 6, 7, 8, 9, and 10. Slubbings from second, third, fourth,

## WOOLEN AND WORSTED MANUFACTURES.

fifth, sixth, and seventh drawing-frames. 11. Roving from roving-frame. 12. Spun yarn.

Figured worsted yarns are woven by various kinds of looms (see JACQUARD LOOM); plain kinds are woven in looms like those for woolens. Unlike woolens, when worsted goods leave the loom, they require only a superficial dressing.

Worsted stuffs are usually classified according to the materials of which they are composed—viz.: 1. Fabrics entirely of wool. 2. Fabrics of wool and cotton. 3. Fabrics of wool and silk. 4. Fabrics of wool, silk, and cotton. 5. Fabrics of alpaca and mohair mixed with cotton or silk.—The *first* of these classes includes the fabrics well known under the name 'merinos,' and so called because they were made first of Spanish wool; for the 'double-twilled' kinds, the French still maintain superiority; but for the 'single-twilled,' the Yorkshire makers are considered the best. This class comprises also shalloons, says, serges, lastings—all stout and heavy fabrics—besides durants, buntings, moreens, damasks, reps, Russells, camlets, and many others, both for dress and furniture. Mousseline-de-laine was, as its name implies, originally all wool, but it is now usually mixed with cotton, and printed.

The *second* class includes two fabrics of which the consumption for women's dresses has been immense—viz., Coburg and Orleans cloths, the former twilled, the latter plain. Many of the names used in the all-wool class are retained in this, with addition of the word 'union,' e.g., union merino, union shalloon, union damask, etc. Winceys, favored for ladies' winter dresses on account of their warmth, are of wool and cotton, from yarns heavier and coarser than those used for cloths like Coburgs. Winceys are largely made at Aberdeen, Perth, Glasgow, and other places in Scotland, as well as in Yorkshire.

The *third* class includes the rich Poplins (q.v.) and Tablinets (q.v.), made chiefly in Dublin, and giving employment there to about 1,200 hands. Paramatta or Henrietta cloth, Canton cloth, and others, are made both of silk and wool, and cotton and wool. Some Coburgs, Orleans, Russells, and Damasks are likewise made with silk warps.

The *fourth* class—viz., mixed goods, in which silk, wool, cotton, and sometimes linen are used—includes peculiar kinds of some of the fabrics named above, also vestings, linings, cravats, shawls, scarfs, quiltings, boot and shoe cloths, barèges, etc.

The *fifth* class includes alpaca lustres and mixtures—plain, twilled, and figured; alpaca poplins; umbrella and parasol cloth; mohair lustres, glacés, Verona serges, barèges, etc.

The term 'worsted' is said to have derived its origin from a village of that name in Norfolk, England, where first this manufacture was carried on. Till the end of the 18th c., worsted goods were a staple trade of Norwich; but the neglect of the factory system there led to its transfer to Bradford, now the metropolis of the manufacture.



## WOOLLETT—WOOLSEY.

In 1885 there were 725 worsted factories in the United Kingdom, with 2,763,521 spindles, 79,931 power-looms, and employing 138,230 hands (55,325 males, 82,905 females).

The rapid increase of the worsted manufacture, as compared with the woollen, is due probably to the greater simplicity of the processes, to the recent introduction of combing-machines, but most of all to the introduction of cotton warps (1835), which not only cheapened the goods, but also vastly increased their variety.

For special branches of the woollen and worsted industries, e.g., carpets, shawls, hosiery, tartans, bonnets, etc., see the several titles. The Scotch-bonnet trade, at Kilmarnock and Stewarton, employs 2,000 to 3,000 hands, and sends out about 500,000 bonnets annually.

WOOLLETT, *wûl'ët*, WILLIAM: eminent English engraver: 1735, Aug. 15—1785, May 23; b. Maidstone. He went early to London; studied his art; and, developing a manner of his own, soon became known as one of the most accomplished engravers of his time. His first important plate was published 1761. In recognition of his merit, he was appointed engraver to George III. (1775). Though his works are familiar, almost nothing is known of his life. He died in London, and a monument was erected to him in Westminster Abbey. His works, especially in landscape, are much prized by connoisseurs.

WOOLMAN, *wûl'man*, JOHN: Quaker preacher: 1720, Aug.—1772, Oct. 7; b. Northampton, N. J. He was brought up on a farm, became clerk at Mount Holly, and taught a school for poor children, learned the trade of tailor, and undertook an itinerant life as a speaker in meetings of Friends throughout the American colonies. He set out 1746 for a tour through the back region of Va., and devoted the rest of his life to such journeys. He was conspicuous as a pioneer in anti-slavery work, both in his preaching, and by such publications as his *Considerations on the Keeping of Negroes* (1753, 2d part 1762). His *Journal* has become well known through its republication with an introduction by John G. Whittier (1871). An ed. of his collected works appeared 1774-5. He died while on a visit to York, England.

WOOLSEY, *wûl'sî*, MELANCTON BROOKS: naval officer: 1817, Aug. 11—1874, Oct. 2; b. in New York; son of Com. Melancton Taylor W. He was midshipman 1832; master 1847; lieut. 1847; on the reserved list 1855; and on the receiving-ship, New York, 1861. Commander of a blockading steamer, he fought at Fort Pemberton, S. C., 1862, repulsed the Confederates at Secessionville, and had part in the attack on James Island. Promoted commander that year, he was in the Gulf squadron, and helped the defeat of the Confederates at Donaldsonville, La., receiving much credit for his part. Until the close of the war he was in the blockading service. He was promoted capt. 1866, commodore 1871; was commandant of the Pensacola navy-yard 1873, and, heroically choosing to remain there during the prevalence of yellow-fever 1874, died of that disease.

## WOOLSEY.

WOOLSEY, MELANCTON TAYLOR: naval officer, hero of the lakes in the war of 1812: 1782-1838, May 18; b. New York. He studied law, but became a midshipman 1800; saw the close of the war with Tripoli; was promoted lieut. 1807, and the next year had charge at Oswego of the first building of U. S. vessels of war on the lakes. He commanded the first vessel completed, the *Oneida*; also the naval station at Sackett's Harbor 1812. In July of that year he repulsed a squadron of 5 vessels, having put half his battery on shore. In 1813 he was in the attack on Kingston; was made master-commandant; participated in the capture of York (now Toronto), and of Fort St. George, at the head of the lake; also in the pursuit of the British squadron; and took a number of vessels from the enemy. The next year he got off safely with guns and stores from Oswego, and captured the pursuing British at Sandy Creek, together with their boats and guns. He was made capt. 1816; stationed at Sackett's Harbor until 1824; was in command of the frigate *Constellation* in the W. Indies 1824-27, of the Pensacola navy-yard 1827-31, of the Brazil station 1832-34, and of the Chesapeake surveys 1836-7.—He died in Utica, N. Y.

WOOLSEY, SARAH CHAUNCEY (pen-name SUSAN COOLIDGE): author of juvenile and other books: b. Cleveland, O., 1845; niece of Pres. Theodore Dwight W. Among her many publications are: *The New Year's Bargain* (1871); *What Katy Did* (1872); *For Summer Afternoons* (1876); *Eyebright, a Story* (1879); *The Guernsey Lily, or How the Feud was Healed* (1881); *A Little Country Girl* (1885); *A Short History of Philadelphia* (1887); *Clover* (1888); and, with others, *Ballads of Romance and History* (1887). She translated from Gautier *My Household of Pets* (1882); edited *Autobiography of Mrs. Delaney* (1879), and *Diary and Letters of Frances Burney* (1880); and the same year published a volume of *Verses*.

WOOLSEY, wŭl'sĭ, THEODORE DWIGHT, D.D., LL.D.: president of Yale College: 1801, Oct. 31—1889, July 1; b. in New York; nephew of the first Pres. Timothy Dwight. He graduated at Yale 1820; studied law one year, and theol. at Princeton Seminary two years; was tutor at Yale 1823-25; was a student of Greek in Europe 1827-30; prof. of Greek at Yale 1831-46, and pres. of that institution 1846-71, after which he gave some instruction in the Law School, while applying himself chiefly to political and social science. He was one of the regents of the Smithsonian Institution, chairman for ten years of the American Bible-revision committee, and held other honorable offices. As occasional preacher he was in high esteem, both as a fervid speaker and a learned and large-minded expounder of the Bible and of theology. In the class-room he was candid while enthusiastic, as a lover of truth should be; and was conspicuous for thorough scholarship and wide knowledge. By his personal qualities of modesty, sincerity, simplicity, and unselfishness, he commanded universal respect and admiration. He was regarded as an authority on international law—a distinction inherited by his son,



## WOOLSON—WOOLSTON.

Theodore Salisbury W., prof. of that dept. in the Yale Law School.—Besides editing the *New Englander* for some years, and contributing to other reviews, Pres. Woolsey published editions in Greek, with notes, of select works of Euripides, Sophocles, Æschylus, and Plato; *Introduction to the Study of International Law* (1860, enlarged 1879); *Essays on Divorce and Divorce Legislation* (1869); *Religion of the Present and of the Future*, sermons (1871); *Political Science, or the State, Theoretically and Practically Considered* (2 vols. 1877); *Communism and Socialism in their History and Theory* (1880); *Eros, and Other Poems* (privately printed 1880); *Helpful Thoughts for Young Men* (1882); and he edited, with notes, Lieber's *Civil Liberty and Self-Government*, and *Manual of Political Ethics*. He also published occasional discourses, including an inaugural on *College Education*, and contributed to *The First Century of the Republic* (1876). To Yale University he gave his library of Greek literature. He died in New Haven.

WOOLSON, *wúl'son*, CONSTANCE FENIMORE: 1848–1894, Jan. 24; b. Claremont, N. H.; grandniece (through her mother) of James Fenimore Cooper. On the removal of her parents to Cleveland, O., she was educated at a young ladies' seminary there and at Madame Chegary's French school in New York. At her father's death, 1869, she began to write; removed with her mother to the south 1873, and resided there, chiefly in Fla., until 1879, when, upon her mother's death, she became a resident of England.

She published, besides contributions to periodicals, *The Old Stone House* (1873); *Castle Nowhere* (1875); *Two Women: a Poem* (1877); *Rodman the Keeper* (1880); *Anne* (1882); *For the Major* (1883); *East Angels* (1886).

WOOLSTON, *wúl'ston*, THOMAS: heterodox clergyman of the English Church: 1669–1731, Jan. 21; b. Northampton. He was educated at Sidney Sussex College, Cambridge; was elected a fellow of his college; and took holy orders. His naturally lively fancy, developed by study of the works of Origen led him to an extreme—and, some have thought, insane—allegorical interpretation of the Scriptures. In his first published work, 1705, W. maintained that Moses was only an allegorical person, and all his history typical of that of Christ; that the miracles of the Pentateuch were allegorical, as also all the miracles attributed to Christ and the apostles; and he stigmatized as atheists and apostates all who received the Scripture narratives as literally, historically true. In later publications he praised Quakerism, denouncing clergymen as 'hireling priests' and ministers of Antichrist: some of his works on the gospel miracles occasioned much scandal as indecent and blasphemous, so that he narrowly escaped prosecution. Until 1720, W. had continued to live in his college, a studious man and showing kindness to the poor. In 1720 he went to live in London; and 1721 his college deprived him of his fellowship. Representing himself as the defender of true Christian doctrine, yet maintaining that the gospel narratives, taken literally, were only a tissue of absurdities, he was triumphantly quoted by the free-think-

## WOOLWICH—WOONSOCKET.

ers in England and on the continent as a champion of their cause. To rid the Christian faith of so dangerous a defender, W. was prosecuted (about 1730) for writings alleged to be blasphemous; was found guilty, and sentenced to be imprisoned for a year, fined £100, and ordered to give securities in £2,000 that he would not repeat his offense. Being unable to pay the fine, and both unable and unwilling to provide the securities, he died in prison after about a year's confinement.

**WOOLWICH**, *wûl'ij*: parish of Kent, England; seat of the chief govt. arsenal, on the s. bank of the Thames; 10 m. by rail (12 m. by steamboat) from Charing Cross, London. It extends 2 m. along the river. Its s. suburbs are handsome and regular. There are numerous places of worship—Anglican, Rom. Cath., and dissenting—and there are numerous schools, a theatre, etc. Its dock-yard (closed, however, 1869), its govt. establishments for manufacturing all war materials (except gunpowder), and the fact that it is a great depot for naval and military stores, also the headquarters of the great corps of royal artillery, give W. great importance. A royal dock-yard existed here 1515. The *Royal George* (q.v.) was built here 1751. The Royal Arsenal, largest in Britain, contains immense stores of all kinds for armies, navies, and forts; and comprises establishments for manufacturing them, and for preparing ammunition. These works are in three departments—Gun Factories, Carriage Department, and Laboratory. On the common, s. of the town, is the Royal Milit. Acad., for education of cadets for the artillery and engineers. See **MILITARY ACADEMY, ROYAL: GUN FACTORIES, ROYAL.**—Pop. (1881) 36,665; (1891) 40,848.

**WOONSOCKET**, *wôn-sôk'ët*: town in Providence co., R. I.; on both sides of the Blackstone river, and on the New York and New England and the New York Providence and Boston railroads; 16 m. n.-by-w. of Providence, 28 m. s.s.e. of Worcester, 38 m. s.w. of Boston. It derives exceptionally fine water-power from the river, and its importance as a manufacturing centre is greatly enhanced by the large number of industrial villages that surround it. In 1900 it had 242 manufacturing establishments, which used a capital of \$14,450,820, employed 8,093 hands, paid annually \$7,563,204 wages, the cost of material being \$7,563,204; and total value of products \$15,627,539. The principal industry was manufacture of cotton goods, for which there were 5 mills employing 2,496 hands, paying \$820,786 wages, using cap. \$4,278,613, turning out products val. at \$2,389,586. For woolen goods, 3 mills, using cap. \$1,004,695, employ. 233 hands, paying \$96,848 wages, products val. \$785,677. Other articles of manufacture were clothing, millinery, boots and shoes. There is a large French pop. working in the mills. The city contained 12 churches—viz., Rom. Cath. 3; Bapt. 2; and Congl., Presb., Meth. Episc., Second Adv., Friends, Prot. Episc., and Univ., each 1. There were 4 national banks (cap. \$550,000), 4 sav. banks; 3 daily, and a number of



## WOORALI.

weekly periodicals; street railways; gas and electric light plants; improved water-works; paid fire dept.; and electric fire-alarm. Among the buildings were city hall; high school and 10 grammar schools; Harris Institute, with free circulating library, lyceum, reading-room, and hall; hospital on the cottage system and with an attractive park; several public halls; and a model opera-house. An object of much local interest and of considerable curiosity to tourists is Woonsocket Hill, which is the highest point of ground in the state (580 ft.), and has a pretty pond on its summit.—Pop. (1890) 20,830; (1900) 28,204.

**WOORALI**, *wó'ra-lí*: poisonous substance known also as *Curare* (q.v.), *Urari*, etc. The physiological action of this fearful poison has been carefully studied by Bernard, Waterton, Virchow, Steiner, Foster, and others; and its remarkable properties have become more fully understood: see Bernard's *Leçons sur les Effets des Substances Toxiques* (1857); Dr. Richard Schomburgk's pamphlet *On the Urari, the deadly Arrow Poison of the Macusis* (Adelaide 1880); and article by Yule, *Nature*, XII.—The best of the earlier investigations is that of Roulin and Boussingault 1828, who obtained from the crude 'woorala' an alcoholic extract, to which they gave the name *curarin*: this was a solid transparent mass, excessively bitter, and having all the virulence of the woorali. Heintz examined the precipitate which tannic acid throws down from the watery solution of the



Woorali or Curari Plant (*Strychnos toxifera*).

poison, but only found that it contained no nitrogen and was composed of apparently inert substances, as sugar, gum, resin, extractive matter, tannic and gallic acids, etc.: he sought in vain for strychnine. Among chief experimenters were De la Condamine (*Mem. de l'Académie des Sciences*, 1745, t. 62, p. 391); Brocklesby (*Philos. Trans.*, 1747, XLIV. 408); Herissant (*Philos. Trans.*, 1751-2,

XLVII. 75), who killed a bear with a poisoned arrow in less than five minutes; and nearly killed himself and a small boy who was evaporating an aqueous solution of the poison—both, however, recovered under the influence of fresh air, a pint of wine, and a quantity of sugar; Fontana (1781), who showed that (notwithstanding the above experiment) the vapor is not deleterious, and that the state of the stomach at the time when the poison was inhaled modified the result, an animal with a full stomach being able to resist the action of a dose fatal to one of the same size when fasting; Brodie (*Philos. Trans.*, 1811–2); Virchow and Münter (see Schomburgk's *Reisen in Britisch Guiana*, I.), who, *inter alia*, showed that the poison, even after being kept dry five years, is still intensely active—that its physiological action shows absence of strychnine, and that it belongs to narcotic rather than to tetanic poisons—and that death takes place not from direct result of the poison, but indirectly, through cessation of the respiratory process; and Kölliker (*Proceedings of the Royal Soc.*, 1857), who arrived at the following conclusions: (1) That the *urari* (as he terms it) causes death very rapidly when injected into the blood or inserted into a wound; and that when introduced by way of the mucous membrane, its effects are slow, and require a large dose; when applied to the skin of frogs, it is inoperative—(2) it acts through the blood, and destroys the excitability of the motor nerves, while the sensory nerves are scarcely affected—(3) when artificial respiration is carried on in animals under its influence, many of the secretions are increased, owing to paralysis of the vascular nerves and consequent dilatation of the vessels—(4) that in mammals the poison causes death by paralysis of the respiratory nerves and suppression of the respiration, which brings on convulsions as a collateral effect.

The researches (1863) of Weir, Mitchell, and Hammond, on the two hitherto undescribed varieties of the poison—named *Woorara, variety Corroval*, and *Woorara, variety Vao*—lead to the following results. The corroval, asserted to be the strongest arrow-poison, but of whose mode of manufacture they could learn nothing, was in large lumps of brownish-black color, resembling vegetable extracts of that tint. From its aqueous solution they obtained a substance possessing all the qualities of an alkaloid, and in an eminent degree the poisonous properties of the corroval; and to this they assign the name *Corrovalia*. Hence it differs materially in chemical composition from ordinary woorali. From a large number of experiments on living birds, mice, cats, frogs, and alligators, they find (1) that corroval differs essentially in its physiological results from any variety of woorali hitherto described; (2) that it acts primarily on the heart through the medium of the blood, arresting the heart's action; (3) that the annihilation of voluntary and reflex movements is a secondary result of its action, depending primarily on the cessation of the heart's action; (4) that it acts on the nerves from the surface to the centre, and abolishes both the sensory and motor functions; (5)



## WOOSTER.

that it destroys muscular irritability; (6) that it paralyzes the sympathetic nerve, this being one of its primary effects; (7) that it is absorbed from both the intestinal canal and the skin of frogs; (8) that its poisonous effects are due to an alkaloid hitherto undescribed. *Vao* is a weaker variety of corroval. The use of *W.* (called also *Woorara* and *Ticuna*) in practical medicine is very limited. It has come to be employed as an anæsthetic in physiological experiment. Its use has been suggested as an antidote to strychnia; but though it would prevent that spasm of the respiratory muscles which is usually the cause of death in strychnia poison, it would doubtless do so by producing equally fatal paralysis.

**WOOSTER**, *wós'tér*: city, cap. of Wayne co., O.; on Killbuck creek, and on the Pittsburgh Fort Wayne and Chicago railroad; 25 m. w. of Massillon, 40 m. e. of Mansfield, 55 m. s.-by-w. of Cleveland. It is an important manufacturing centre in a fine agricultural region, and is the seat of Wooster Univ. (Presb.), chartered 1866, which had (1901-2) 51 professors and instructors, 400 male and 362 female (762) students, 25,000 vols. in the library, \$25,000 in scientific apparatus, \$100,000 in grounds and buildings, \$250,000 in productive funds, \$35,590 income; pres., Rev. Louis E. Holden, D.D., W. contains 14 churches, high school, graded schools, national and other banks, and 2 daily and 4 weekly periodicals; and manufactures machinery, furniture, brushes, agricultural implements, musical instruments, carriages and wagons, flour, woolen goods, engines, boilers, etc.—Pop. (1880) 5,840; (1890) 5,901; (1900) 6,063.

**WOOSTER**, *wús'tér*, **CHARLES WHITING**: naval officer: 1785-1848; b. New Haven, Conn.; grandson of the patriot soldier Gen. David W. He early acquired a fortune capturing prizes with the privateer *Saratoga* in the war of 1812. In 1817 he sold his armed brig *Columbus* to the Chilian govt., and became a capt. in its service. After a fortunate cruise on the coasts of Peru and Mexico, he joined an expedition to intercept a Spanish frigate and fleet of nine transports; was foremost in the success achieved, and was put in command of the captured frigate. W. declined 1819-22 to serve under Lord Cochrane, who had the chief command of the Chilian navy; but returned to his old command after Cochrane's departure, and became rear-admiral 1829. He went to Cal. 1847, but was not successful in mining.

**WOOSTER**, **DAVID**: revolutionary soldier: 1710, Mar. 2-1777, May 2; b. Stratford, Conn. He graduated at Yale 1738; on the outbreak of war between England and Spain 1739 he became lieut. in the provincial army, and later capt. of a vessel fitted out by the colony for defense of its coasts. He served in Aaron Burr's regt. 1745, in the Louisburg expedition, and went thence to England in command of a cartel. Under Sir William Pepperell he was a capt. on half-pay to 1774; was made col. 1775, and later brig.gen.; served during the French war 1756-63; origi-

## WOOTZ—WORCESTER.

nated the expedition that captured Ticonderoga 1775, Apr.; was a member of the Conn. assembly; and on the organization of the continental army was third of eight brig.gens. appointed. He served in Canada with Montgomery, was in command after the latter's death, and on returning home was made first maj.gen. of the Conn. state militia. He was in command at Danbury, Conn., 1776-7, raising recruits and provisions; and on an attack by Gov. Tryon's troops 1777, Apr. 26, had command of 200 men, who came upon Tryon's force n. of Ridgefield, and after a successful assault were shattered in a second assault by artillery fire, with the mortal wounding of their leader while seeking to rally his men.

WOOTZ, *n. wóts*: a superior quality of finely damasked hard cast-steel imported from India, and of which it is said the celebrated Damascus sword-blades were made. Faraday found aluminium in a sample which he analyzed, and referred its peculiar properties to the presence of this metal; but other chemists have failed to find the aluminium.

WOP, *v. wöp*: same as WĤOP (q.v.).

WORCESTER, *wórs'tér*: city, one of the caps. of Worcester co., Mass.; on the Blackstone river, and on the Boston and Albany, the Boston and Maine, the Fitchburg, the New York and New England, the New York Providence and Boston, and the Worcester and Shrewsbury railroads; 43 m. n.w. of Providence, 44 m. s.w. of Boston; area 36 sq. m. It is the second city in size in the state, is in a highly cultivated agricultural region, and is noted for its large and varied manufactures and for its educational institutions. It is substantially built and regularly laid out, and has two public parks: one, the 'old common,' contains an imposing soldiers' monument by Randolph Rogers, and a monument to Col. Timothy Bigelow of revolutionary fame. In 1891 the city had 195 m. of streets, improved sewerage system with 60 m. of sewers, 100 m. of water mains, 514 gas lamps, 201 electric lights, police dept. of 94 officers and men (annual cost \$73,332), fire dept. of 4 engines and 142 men (annual cost \$50,000), water system with reservoir capacity of 1,200,000,000 gals. average daily water consumption 4,753,680 gals. On 1903, Feb. 1, the total bonded debt was \$10,460,000, sinking fund \$4,810,958; total net debt \$5,649,042, and the assessed valuation, real estate \$90,140,650, personal \$26,090,073—total \$116,230,723; tax rate \$16 per \$1,000. There were 7 national banks (cap. \$1,650,000). Of churches there were 73—viz., Congl. (evangelical) 18; Prot. Episc. 14; Bapt. 13; Meth. Episc. 11; Congl. (Unit.) 4; Univ. 3; Luth. 3; Hebrew 2; Christadelphian 2; and Armenian Free Bapt., Disciples, Friends, Presb., Second Adv., and Meth. Episc. African Zion, each 1.

In the school year 1901-2 W. had 22,522 children of school age (5-15 years), of whom 16,910 were enrolled in the public schools, and 14,705 were in average daily attendance. There were 71 public-school buildings, with



## WORCESTER.

seating capacity for 22,559 pupils, and 53 male and 501 female teachers; 1 classical high school with 29 teachers, 317 male and 393 female (710) pupils, vols. in library 2,817, value of grounds, buildings, etc., \$195,000; 1 English high school with 34 teachers, 392 male and 570 female (962) students, vols. in library 1,575, value of grounds, buildings, etc., \$190,000. The State Normal School, opened 1874, had 15 instructors, 10 male and 208 female pupils; value of grounds and buildings \$202,700; receipts from the state \$23,375. Among the private secondary schools were: Worcester Acad. for boys, opened 1834, which had 14 teachers, 207 students, \$500,000 in grounds and buildings, 2,500 vols. in library, D. W. Abercrombie, A.M., principal; the Highland Milit. Acad. (Prot. Episc.), 1856, which had 8 teachers, 52 students, \$35,000 in grounds and buildings, Joseph Alden Shaw, A.M., principal. Of the two colleges of liberal arts, the older is the College of the Holy Cross (Rom. Cath.), founded 1843, which had 39 profs. and instructors, 372 students, 21,000 volumes in the library, value of scientific apparatus and library \$28,000, value of grounds and buildings \$500,000, Rev. J. F. Hanselman, S.J., pres. Clark Univ., chartered 1887, opened 1889, Oct., was founded on a preliminary gift of \$2,000,000 by Jonas G. Clark. It is patterned after the most approved German universities; has 5 related faculties—mathematics, physics, chemistry, biology, and psychology—and aims chiefly to promote original research and advanced study; hence advanced students only are received. There are 16 fellowships of \$600 a year and 20 of \$400, established by the founder; also 20 scholarships; Granville Stanley Hall, PH.D., LL.D., is pres. (see CLARK UNIVERSITY). W. is the seat of a noted scientific school, the Worcester Polytechnic Institute, chartered 1865, which had (1900-1) 32 profs. and instructors, 270 students, 65 scholarships, 7,000 vols. in library, scientific apparatus and library valued at \$221,573, grounds and buildings, \$507,000, productive funds \$875,285, income from state appropriation \$72,782, total income \$204,289, benefactions \$10,000, T. C. Mendenhall, LL.D., pres.—The U. S. report for 1899-1900 gave for W., in addition to the school and college libraries, the Amer. Antiquarian Soc. library (founded 1812) 100,000 vols.; City Hospital (1872) 1,000 vols.; Free Public (1859) 128,196 vols.; Worcester Co. Horticultural (1842) 3,000 vols.; Worcester Co. Mechanics' Assoc. (1843) 13,431; Worcester Lunatic Hospital (1878) 3,900 vols.; Worcester Soc. of Antiquity (1875) 16,000 vols.; total 384,000. There are circulating subscription libraries.

In 1890 W. had 996 manufacturing establishments, which employed \$25,230,620 capital and 21,729 persons, paid \$11,694,121 wages, used materials valued at \$21,208,904, and yielded products valued at \$39,533,869. The two wire-manufacturing establishments (one the largest in the world) employ 4,000 hands, and yield products of iron, copper, and steel wire valued at \$8,000,000. Other leading industries according to capital employed were: foundry and machine-shop products, 78 establishments, capital

## WORCESTER.

\$4,501,791, employees 3,575, wages \$2,200,179, materials \$2,333,293, products \$5,472,417; boots and shoes (factory product), 15 establishments, capital \$1,502,823, employees 1,571, wages \$804,031, materials \$1,709,979, products \$2,923,545; woolen goods, 14 establishments, capital \$1,269,399, employees 923, wages \$356,367, materials \$835,549, products \$1,374,857; lumber, planing-mill products, sash, doors, blinds, etc., 8 establishments, capital \$574,300, employees 333, wages \$210,942, materials \$339,046, products \$630,571; carpentering, 69 establishments, capital \$526,330, employees 999, wages \$734,201, materials \$1,186,579, products \$2,107,628. In 1900 there were reported in W. 1,071 manuf. estab. employ. \$42,966,742 capital and 25,593 persons, paying \$12,894,781 for wages and \$26,666,176 for materials used, and yielding products valued at \$53,348,783. In the Mechanics' Association the working-people of W. have abundant opportunities for self-improvement, as the assoc. possesses one of the largest lecture-halls in the country, a splendid technical library, and commodious and well-equipped reading-rooms; and gives annually a course of popular, instructive lectures. This hall is used also by the Worcester Co. Musical Assoc. for its annual musical festivals.

W. was settled 1674, on a tract 8 m. sq., purchased from the Indians for £12, New England money; but owing to the troubles incident to the King Philip (q.v.) war, no permanent settlement was made till 1713. The first public reading of the Declaration of Independence in the state took place at the Old South Church here. The town received a city charter 1848.—Pop. (1870) 41,105; (1880) 58,291; (1890) 84,655; (1900) 118,421.

**WORCES'TER:** city, capital and assize town of the county of Worcestershire, England, and a county of itself; on the Midland and the Great Western railways; near the centre of the Severn valley, principally on the e. bank of the Severn; about 26 m. s.w. from Birmingham, 120 m. from London by rail. W. is of great antiquity; there are abundant traces of ancient iron-smelting works on the banks of the river, assigned by antiquaries to the times of the Roman occupation; and the frequent discovery of other remains proves that the city was a Roman station. The Romans found here a British settlement, which they made a military station, calling it Vigorna: the Saxons called it Wigorna-ceaster, whence the present name. The chief object of antiquity now existing is the cathedral, beautifully placed on a gentle elevation on the e. bank of the river. A cathedral, dedicated to St. Peter, was founded here as early as the 7th c. In 1084 Bp. Wulstan laid the foundation of a new cathedral, many portions of which remain in the present structure, such as the crypt (one of the oldest and most interesting in England), the bases of and fragments in many of the walls, chapter-house, refectory, and cloisters. In the civil wars much damage was done to the building, though none of its leading features were destroyed. It is now distinguished by the simplicity, if not plainness, of the exterior, which is amply



## WORCESTER.

compensated by the fine perspective, the lofty roof, and generally charming effect of the interior. As the cathedral had long been much out of repair, a thorough restoration was commenced 1855 under the late Sir G. G. Scott, and completed under Perkins at a cost of about £100,000. The tombs of King John, and of Arthur, Prince of Wales (eldest son of Henry VII.), are the chief ancient monuments in the building. The Episcopal Palace in the city has been transformed into the Deanery; and the bp. of W., since the ecclesiastical commissioners assumed the management of the episcopal and capitular estates, has his residence at Hartlebury Castle. The bishop of W.'s revenue has been fixed by the ecclesiastical commissioners at £5,000; and the livings in his gift are numerous and of considerable value. Worcester chapter consists of the dean, 4 canons, 24 honorary canons, and 4 minor canons, including the precentor. Besides 10 chorister boys, there are 40 other boys on the foundation at the College or Cathedral School, who receive gratuitous education, and about 60 non-foundation boys. There is also a city grammar school, founded by Queen Elizabeth, and largely attended. The 11 parish churches of the city are poor specimens of architecture. The city does not shine in public buildings. Next to the cathedral, the most important are the Shire Hall, the Guildhall, and the county prison; but there are also the city library, the W. Museum, a corn exchange, and music-hall. The battle of W., 1651, is memorable in history, and Charles II., to commemorate the fidelity of the citizens to his cause, granted the motto to the city arms, 'Civitas in bello et in pace fidelis.'

The people are employed in glove-making, including leather dressing and staining; in porcelain factories; iron-works, including locomotive-engine factories; tanning and currying, horse-hair weaving, vinegar, British wine and sauce making, and coach-building. Chemical manures and agricultural implements are manufactured. Glove-making is still considered the staple manufacture; but one large factory has absorbed a large portion of the business, and now there are scarcely one-fourth as many master-glovers as half a century ago. There are two porcelain factories, employing about 500 hands. The Royal Porcelain Works are celebrated for taste in designing, and for beauty of execution of the highest class of productions; while the specialty of the other factory is utility, combined with purity of design and excellence in workmanship. The glazed semi-porcelain is also famous. Hops are grown in the neighborhood; and there is trade in malt, grain, and coal. There are a daily and four weekly newspapers, one of the latter the oldest provincial paper in England (founded 1690).—Pop. parliamentary borough (1881) 40,354; (1891) 42,905; (1901) 46,623.

WORCES'TER (EDWARD SOMERSET), second Marquis of: English inventor: about 1601-67. During the civil war he was a zealous defender of the royalist cause. Although regarded as a mere speculator by his contemporaries, W. invented the first working Steam-engine (q.v.): it could raise a column of water 40 ft. in height, and was set up at Vauxhall, near London. This is described in his *Century of Inventions* (1655; reprinted in Dirck's *Life and Times of Marquis of W.*, 1865), also in his *Exact and True Definition of the Most Stupendous Water-commanding Engine*, etc.

WORCESTER, wûs'tér, JOSEPH EMERSON, LL.D.: lexicographer: 1784, Aug. 24—1865, Oct. 27; b. Bedford, N. H. Employed in farm-work, he prepared himself late for entering the junior class at Yale, graduating 1811. He taught in Salem, Mass., studied at Andover, and began literary work there, publishing *A Geographical Dictionary* (2 vols. 1817), and a *Gazetteer of the United States* (1818). He removed to Cambridge, and published *Elements of Geography, Ancient and Modern* (1819); *Sketches of the Earth and its Inhabitants* (1823); *Elements of History*, and a *Hist. Atlas* (1826); *Epitome of History* (1827); *Outlines of Scripture Geography* (1828); *Longevity and the Expectation of Life in the United States* (Transactions of Amer. Acad. of Sciences, 1826); an edition of Johnson's Dictionary (1828); an abridgment of Webster's Dictionary (1829); and his own *Comprehensive Dictionary* (1830). He edited the *American Almanac* 1831-43. In 1831 he went to Europe to get material for his *Universal and Critical Dictionary of the English Language*, which was published 1846. For the next three years he was incapacitated for work by cataract of the eyes, which was removed by surgery. He issued editions of his dictionary, with enlargements, 1847-55. The quarto by which he is now best known, *Dictionary of the English Language*, was published 1860, having been prepared with expert help in many departments. It was preferred by many who adhered to usage instead of the slight modifications in spelling introduced into the earlier editions of Webster, and it was indispensable to the English scholar for comparison of definitions with Webster's. Cambridge and Boston gave it the preference as a home product. It is said to have been the first dictionary with illustrative engravings; but the *Youth's Lexicon*, in the first part of the 19th c., though a small octavo, was prior, as were also other works that pictured as well as defined, such as Brande's *Dict. of Literature, Science, and Art*. Dr. Worcester's work is a monument of industry and learning, which was recognized by his election to many learned societies. A memoir of him by Ezra Abbot was read to the Amer. Acad. of Sciences 1866.



## WORCESTER.

WORCES'TER, NOAH, D.D.: Unitarian minister: 1758, Nov. 25—1837, Oct. 31; b. Hollis, N. H. At an early age he was fifer in the patriot army 1775-77, having part in the battles of Bunker Hill and Bennington; afterward taught school at Plymouth, N. H.; was a member of the legislature after 1782; became a minister, and was pastor of the church in Thornton 1787-1802; home missionary in n. N. H. 1802; preached in Salisbury, N. H., 1810-13, and after that lived in Brighton, Mass., editing the *Christian Disciple* 1813-18, and the quarterly *Friend of Peace* 1819-29. He was founder of the Mass. Peace Soc. 1815, and its sec. 13 years. Among his publications were: *Familiar Dialogue between Cephas and Bereas* (1792); *Bible News* (1810); a volume on the divinity of the Son of God (1810); *Respectful Address to the Trinitarian Clergy* (1812); *Solemn Review of the Custom of War* (1814); *The Atoning Sacrifice* (1829); *The Causes and Evils of Contentions among Christians* (1831); *Last Thoughts on Important Subjects* (1833).—See *Memoirs* by Dr. Henry Ware (1844). He died in Brighton, Mass.

WORCES'TER, SAMUEL, D.D.: Congregational minister: 1770, Nov. 1—1821, June 7; b. Hollis, N. H.; bro. of Noah W. He graduated at Dartmouth 1795; was pastor in Fitchburg, Mass., 1797-1802, and in Salem 1803 until his death. He was also corr. sec. of the Amer. Board of Foreign Missions from 1810. He died in Brainerd, Tenn., on a journey for his health. He published *Discourses on the Covenant with Abraham* (1805); *Letters to the Rev. William E. Channing on Unitarianism* (1815); *Watts's Entire and Select Hymns* (1818); and a vol. of his sermons was published two years after his death. His collection of hymns was in general use for many years. See his *Life and Labors* (1852), by his son Samuel Melancthon W. (1801-66), who was prof. of rhet. and oratory at Amherst Coll. 1825-34, pastor of his father's church at Salem 1834-60, senator and representative in the state legislature, and author of *Essays on Slavery by Vigorinus* (1826).

WORCES'TER, THOMAS, D.D.: Swedenborgian minister: 1795, Apr. 15—1878, Aug. 12; b. Thornton, Mass.; son of Dr. Noah W. He graduated at Harvard 1818, studied theol. there, and was the first minister of the Swedenborgian communion in Massachusetts. He was pastor of the Soc. of the New Jerusalem Church in Boston 1821-67, pres. of the Mass. Assoc. of that faith, and presided at the general conventions of the New Church 1839-75. He was an overseer of Harvard 1854-60. An industrious and able writer in advocacy of the Swedenborgian doctrines, he published only occasional sermons, addresses, and articles. He was a man greatly esteemed for refinement and beauty of character.

## WORCESTER COLLEGE—WORCESTERSHIRE.

WORCES'TER COLLEGE, OXFORD UNIVERSITY, England: institution founded, like Trinity and St. John's, on the site of an old monastic college; and anciently known as Gloucester College, because it belonged to the Benedictine monks of Gloucester. After the dissolution of the monasteries, it passed through various hands; and latterly was a hall attached to St. John's College. In 1701, however, Sir Thomas Cookes left £10,000 for the purpose of endowing some existing college or hall. This bequest led to the erection of Gloucester Hall into a college, for a provost, six fellows, and six scholars, by letters patent of Queen Anne 1714. There are now 15 fellowships, 16 scholarships (mostly of the value of £75, tenable five years), and 6 exhibitions. There are 10 benefices in the gift of this college.

WORCES'TERSHIRE: one of the w.-midland counties of England; having for its conterminous counties those of Warwick and Stafford on the n., Warwick and Oxford on the e., Gloucester on the s., and Hereford and Salop on the w.; 472,453 acres, of which about 400,000 are cultivated; greatest length 38 m., greatest breadth 26. The surface is undulating, and there are depressed valleys and hilly ranges. On the w. the hilly range terminates in the Malvern Hills, one of the highest points of which is the Worcestershire Beacon, about 1,100 ft. above sea-level; but the highest peak of the range is the Herefordshire Beacon, in the county of Hereford. The e. range is the Bredon Hills. The county is well watered, and finely timbered, especially with fruit-trees. The elm grows luxuriantly and is common everywhere. The oak, beech, and other timber-trees thrive well, and the larch has been much planted. The principal rivers are the Severn, the Teme, and the Avon. The Severn is navigable for vessels of 80 tons as far as Worcester, and of 60 tons to Stourport, 14 m. farther; and smaller boats can reach Shrewsbury, the river being thus navigable 180 m. There are three canals communicating with the Severn. The W. portion of the vale of Severn is about 30 m. long; the climate is mild and healthful; but the rainfall is small, and nearly the minimum of England. There are mineral springs at Malvern, Evesham, Dudley, and Kidderminster. Nearly the whole county is on the red sandstone formation, but the Malvern and Lickey Hills are of igneous origin. The soil is of almost every variety suitable for vegetation, from strong deep clay and rich vegetable mold to light friable sandy rye-land, with tracts of alluvial deposit, marl, and loam. The vale of Evesham is dependent on the Avon for its fertility, which has long gained for it the reputation of being the garden of the mid-west: it produces abundance of table-fruit, and vegetables of finest quality. High-farming is much in vogue. Excellent crops of wheat and other grains, turnips, and potatoes are raised; a large portion of the land remains in meadow, and much of it ancient pasture.

Hop-gardens are plentiful in the w. division, and their product ranks, in the estimation of brewers, next to that of East Kent. W. is *par excellence* a perry county, as Here-



## WORD.

fordshire and Devonshire are cider counties. Its pear orchards are very beautiful in the time of blossom; and there is a splendid variety, the 'black pear of Worcester,' which attains great size and is supposed to be the traditional pear blazoned on the county's shield of arms.

There is no distinctive local breed of stock, either cattle or sheep. The markets are well supplied with butcher meat, bred and fed in the county; and London, Birmingham, and the 'Black Country' draw large supplies from W. The county has great mineral wealth in coal, iron, salt, lime: the first three are found in the n.e.; lime is generally distributed. Coal and iron mines are largely worked near Dudley. Iron-works abound between Dudley and Stourbridge, where are large manufactures of ornamental glass; and there are abundant coal mines in the neighborhood.

The textile fabric manufactures are nearly confined to carpet-weaving, long carried on at Kidderminster; though that town has almost ceased to produce the carpets known by its name, 'Brussels' and 'tapestry' principally being manufactured. W. china, which has gained world-wide reputation, is produced on a large scale in W. At Redditch the needle and fish-hook manufacture is carried on to a greater extent than in any other place in England; nail-making has been practiced for centuries at Bromsgrove; and at Droitwich, about 6 m. from Worcester, salt has been manufactured for many centuries from an inexhaustible supply of brine.—Pop. (1901) 358,356, of whom a large number are connected with mines and manufactures (more than 8,000 in hardware manufacture), and the remainder are engaged in agricul. or dependent on trade.

**WORD**, n. *wérđ* [Goth. *vaurđ*; Dan. and Sw. *ord*; Dut. *woord*; Ger. *wort*, word; Lith. *wardas*, name: allied to L. *verbum*, a word]: a single part of speech; an articulate sound, or combination of sounds, expressing an idea; a vocable; the letters which represent such a vocable; a term; talk; discourse; an order; signal; Password (q.v.); tidings; a message; a dispute; a declaration; promise, as to pass one's *word* (implying obligation or good faith); in *OE.*, a motto; a proverb: V. to express in words. **WORD'-ING**, imp.: N. the act or manner of expressing in words. **WORD'ED**, pp. **WORD'Y**, a. -*ĭ*, using many and needless words; full of words; verbose; verbal. **WORD'ILY**, ad. -*lĭ*. **WORD'INESS**, n. -*nĕs*, the state or quality of abounding in words; verbosity. **WORD'LESS**, a. -*lēś*, silent. **WORD'-BOOK**, a vocabulary or collection of words arranged in alphabetical or other regular order. **A GOOD WORD**, commendation; an expression to edify or instruct. **GOOD WORDS**, words spoken or written for improvement; wise instruction. **IN WORD**, in declaration or resolution only. **IN A WORD**, briefly; to sum up. **BY WORD OF MOUTH**, orally; by actual speech, and not by a written message. **THE WORD**, one of the titles of Jesus Christ, the Son of God; same as *The Logos* (q.v.): also the Scriptures pre-eminently. **WORD FOR WORD**, in the exact order of words; verbatim. **TO EAT ONE'S WORDS**, to retract what has been said.

## WORDE—WORDEN.

**WORDE**, *waword*, **WYNKIN DE**: early printer, brought to England by William Caxton (q. v.) on his return about 1477: b. Lorraine; d. London, about 1534. Caxton made De W.'s acquaintance at Cologne. De W. superintended Caxton's printing-office till the latter's death, and afterward succeeded him. He made great improvements in the art of printing, especially in type-cutting, then a branch of the profession. He is said to have introduced Roman letters into England, using them as we now use italics. In some of his books he even introduced a sprinkling of Greek, Hebrew, and Arabic, produced in wood-cut. He also made extensive use of engravings, which, however, appear to have been obtained mostly from the continent. The books printed by him are generally distinguished by their neatness and elegance, and far exceed in number those of his predecessor, being 408 distinct works against 99 by Caxton.

**WORDEN**, *wér'dèn*, **JOHN LORIMER**: naval officer. b. Westchester Co., N. Y., 1818, Mar. 12. He entered the navy as midshipman 1835, Jan. 12; became passed midshipman 1840, July 16; was promoted lieut. 1846, Nov. 30, and saw varied service until the civil war, when his delivery of orders from the sec. of the navy, 1861, Apr., saved Fort Pickens to the Union. In returning from this service he was arrested by the Confederates and made prisoner for seven months. On being exchanged he was sent to take command of the *Ericsson Monitor*, then approaching completion; and on a summons to the scene of war hastily made in the ill-prepared vessel a stormy and perilous passage from New York, reaching Fortress Monroe 1862, Mar. 8, at 10 P.M. He went at once to the aid of the *Minnesota*, which was lying aground opposite Newport News, where the Confederates had the day before sunk the *Cumberland*, driven the *Congress* ashore, and shown that their iron-clad *Merrimac* was apparently irresistible. On the next morning (Sunday) the *Monitor* went into battle about 8, when the confederate ram was approaching to destroy the *Minnesota*. The *Monitor* quickly scattered the steamers and other craft supporting the *Merrimac*, and hotly fought the iron-clad from three to four hours, at from 600 to 150 ft. distance, using two guns with 178-pound cast-iron shot, against the eight guns of the *Merrimac* fired as rapidly as possible. The *Monitor* was struck 22 times, but wholly escaped injury, even when rammed by her antagonist, and proved not only more than a match for the *Merrimac*, but the prototype of a new instrument of war. Capt. W. suffered a severe wounding of his eyes and temporary blindness through a shot striking the observation slit of the pilot-house, but he soon recovered. This engagement, though a drawn battle, saved the U. S. fleet from destruction, and Washington, New York, and other cities from capture. W. received from congress votes of thanks 1862, July 11, and 1863, Feb. 3; was promoted capt. and commanded an iron-clad in the s. Atlantic squadron 1863, Jan.—June; was on duty at New York 1863–66, and in the Pacific squadron 1866–7; was promoted commodore 1868, May 27, commissioned rear-admiral 1872, Nov. 20, and was supt. of the Naval Acad. 1870–74. He



## WORDSWORTH.

was in chief command of the European squadron 1875, Feb. 3—1877, Dec. 23, then member of the naval examining board, and pres. of the retiring board until 1886, Dec. 23, when he was retired by special act of congress, with the highest sea-pay of his grade. He died 1897, Oct. 18.

WORDSWORTH, *wérds'wérth*, CHARLES, D.C.L.: 1806, Aug. 22—1892, Dec. 4; b. Bocking, Eng.; son of Dr. Christopher W. (master of Trinity Coll., Cambridge) and nephew of the poet. He was educated at Harrow and Oxford, taking high prizes and 'first classes;' was known also as an athlete; and graduated B.A. 1830. He continued his Oxford residence several years as private tutor, having among his pupils William E. Gladstone and Cardinal Manning; was second master of Winchester Coll. 1835-45; warden of Trinity Coll., Glenalmond, 1846-52, and then was elected bp. of St. Andrews, Dunkeld, and Dunblane. He was one of the New Test. revision committee. Among his publications are: *Christian Boyhood in a Public School* (1846); *On Shakespeare's Knowledge of the Bible* (1854); *A United Church for a United Kingdom* (1860); *The Outlines of the Christian Ministry Delineated* (1872); *Discourse on Scottish Church Hist. from the Reformation to the Present Time* (1881); *Shakespeare's Hist. Plays* (1883); *Public Appeals in Behalf of Christian Unity* (1886); *How to Read the Old Testament*, a letter to his Grandchildren (1887); and *Ecclesiastical Union between England and Scotland* (1888). His occasional publications, such as *Letter to the Rt. Hon. W. E. Gladstone on Christian Instruction*, and *Opinions* in the cases of the bishop of Brechin and the Rev. P. Cheyne, are very able.

WORDSWORTH, CHRISTOPHER, D.D.: Anglican prelate: 1807-1885, Mar. 21; nephew of the poet William W.; b. Ashby. He graduated 1830 at Trinity Coll., Cambridge, where he took high honors, medals, and a fellowship; travelled in Greece 1832-3; was appointed public orator at Cambridge 1836; was head-master of Harrow School 1836-44; canon of Westminster 1844; vicar of Stamford-in-the-Vale 1850; and was consecrated bp. of Lincoln 1869. His publications were very numerous; besides those of an official character, are: *Athens and Attica* (1836); *Inscriptiones Pompeianæ* (1837); *Greece* (1839); *Discourses on Public Education* (1844); *Diary in France* (1845); and volumes on the Church of Rome (1847), the sacred canon (1848), the Apocalypse (1848), the mystic Babylon (1850), inspiration (1861), interpretation (1861), the Church of Ireland (1866), the Maccabees (1871), the intermediate state (1875), future rewards (1878), the revised version (1881); also *Miscellanies* (1879); *The Church Sunday* (1880); *A Church History* (1881-83); *John Wicliff* (1884); and *Christian Womanhood* (1884).—His father, CHRISTOPHER W., D.D., youngest brother of the poet, 1774, June 4—1846, Feb. 2, b. at Cocker-mouth, graduated at Cambridge. After a number of chaplaincies and rectorships, he was master of Trinity Coll., Cambridge, 1820-41; was author of *Ecclesiastical Biography*, 6 vols. 1810, 4 vols. 1853; and *Christian Institutes*, selections from the writings of English divines (1836); and other works.

## WORDSWORTH.

WORDSWORTH, JOHN, D.D.: Anglican bp. of Salisbury; b. Harrow, Eng., 1843, Sep. 21; son of Christopher W., and nephew of Charles W. He graduated at Oxford Univ., 1865; was asst. master at Wellington College, 1866-7; fellow of Brasenose College, 1867-8, and tutor there 1868-83; ordained deacon 1867, and priest 1869; prebendary of Lincoln 1870-83; examining chaplain to the bp. of Lincoln, 1870-85; proctor of Oxford Univ. 1874, and select preacher 1876; Bampton lecturer 1881; Oriel prof. of the interpretation of Holy Scripture 1883; canon of Rochester 1883; and became bp. 1885. He published numerous lectures, and for many years was engaged in preparing an edition of the Vulgate New Test., of which part I. was issued 1889, part II. 1890.

WORDSWORTH, WILLIAM, D.C.L.: English poet: 1770, Apr. 7—1850, Apr. 23; b. Cockermouth, in Cumberland; second son of John W., attorney, and agent on the estates of the Earl of Lonsdale. He was sent to school at Penrith, where his parents had gone to reside; and after the death of his mother, 1775, was transferred to the public school at Hawkshead, in Lancashire, 1778. In 1783 his father died, leaving his family with no large possessions. A considerable sum which was due from Lord Lonsdale that eccentric nobleman would not pay—resisting the claim with all legal impediments. There was enough, however, with some assistance from relatives, to carry forward the education of the children. W. remained at Hawkshead till 1787, in which year he was entered at St. John's College, Cambridge: here he remained four years. In the assigned studies his interest was slight; but in his own fashion he was a diligent student; and poetry became more and more his favorite pursuit. In 1791, Jan., he left Cambridge, taking his degree as bachelor. During the previous autumn, he, with a fellow-student, had made a pedestrian tour through France, then in the early fervors of its great Revolution; and thither, after leaving college, he returned. His sympathy with the aims of the Revolution was passionate; and with the party of the Gironde he seems to have cultivated relations so intimate that in the end they might have seriously compromised him, had not circumstances, probably of the pecuniary sort—the cutting off of supplies from his relatives—determined his return to England not long before his French friends were sent in a body to the scaffold. The republican principles which at this time he held, he lived to renounce in favor of a reasoned conservatism; and opposed as he was at first to the war against France, no one more patriotically urged it when the struggle became in effect a life-and-death grapple on the part of England with the military despotism of Napoleon.

In 1793 W. came before the public as author, in two poems—*An Evening Walk, addressed to a Young Lady*; and *Descriptive Sketches, taken during a Pedestrian Tour among the Alps*. These pieces abound in touches of refined and original observation of nature, but otherwise are not remarkable; and they failed to make any impression, except on a few minds, such as that of Coleridge, then at Cam-



bridge, who afterward professed to have discerned in them a great undeveloped genius. W. was now in much perplexity; his little finances were almost exhausted; he had at this time an aversion to the priestly profession, which his friends would have had him enter; poetry had become with him a passion, to which he longed to dedicate himself; and unhappily it appeared that *his* poetry would not *pay*. As a poet cannot live like a singing-bird by pecking about the hedgerows, it became necessary for him to find some means of support; and he was on the point of going to London, to do liberal politics for the newspapers, when unexpected relief came in the shape of a legacy from an intimate friend and admirer, Raisley Calvert, who at his early death, 1795, was found to have bequeathed to W. £900, expressly that he might have leisure for a few years for undisturbed development of his powers. Small as the sum may seem, it sufficed for a term of years to a man of the poet's simple tastes and entire singleness of aim. With his only sister, Dorothy, his attached companion through life, and always a devout believer in the brother whose genius she shared, he settled at Racedown Lodge, Dorsetshire, removing 1797 to Alfoxden, Somersetshire, to be near Coleridge, who had established himself within two miles at Nether-Stowey. Out of the intimacy thus begun, came the famous *Lyrical Ballads*, published 1798 by Cottle of Bristol, as a joint adventure of the two poets. The volume had no success; but few men have ever been more serenely self-appreciative than W.; and he did not allow himself to be disheartened by the neglect of the world. After a short tour in Germany, with his sister and friend, he returned to his native Cumberland, which he never again permanently left. He settled first at Grasmere; 1808 he removed to Allan Bank, in the vicinity; and 1813 he transferred his household to Rydal Mount, which remains specially associated with his memory. On the death of the old Lord Lonsdale, the justice of the claim of the Wordsworths against the estates was admitted; and 1802, when W. and his sister must have been near the end of Calvert's convenient legacy, a sum of about £8,000 was by Lord Lonsdale's successor made over to the family. Henceforth a modest competence was secure to them; and W. was wedded within the year to Mary Hutchinson, his cousin, with whom he had been intimate from his childhood. In 1813, by the kindness of Lord Lonsdale, he was appointed distributor of stamps for the county of Westmoreland, a situation which brought him little work, and a salary of £500 a year. When, the year following, he published his great poem, *The Excursion*, he dedicated it to Lord Lonsdale, in a sonnet expressive of 'high respect and gratitude sincere.' Meantime, pending the appearance of this elaborate work, the reputation of the poet had been surely though slowly rising. In 1800 he had published, in two vols., a second edition of the *Lyrical Ballads*, disjoining his own from those of Coleridge, and adding a quantity of new matter; and 1802 and 5 further editions had been issued. To these succeeded, 1807, a new collection, *Poems, in Two Volumes*. In these earlier writ-

ings there was a good deal which seemed almost wilfully to invite ridicule; and for a while W. was the laughing-stock of reviewers, particularly of Jeffrey who, as editor of the great *Edinburgh*, at this time figured as chief Aristarchus of the day. Jeffrey, however, did not fail to recognize the strength and beauty in certain passages scattered through W.'s works. The nickname 'the Lake School' was invented, which, with W., included Coleridge and Southey, who chanced to reside in the same district: it has long since become a name of repute; but in its origin it carried a tone of disesteem. However, it could not be long concealed that these volumes of W., despite occasional eccentricity in choice of mean and impracticable subjects, contained a body of true poetry of singularly fresh and original kind. A select circle of passionate admirers, including men like Leigh Hunt, De Quincey, and Wilson, eagerly pressed W.'s claims; and after the publication of *The Excursion*, a volume of high and serious verse, gravely defective in plan, and at times heavy and tedious, but with little trace of the poet's earlier oddities, it came more and more to be felt that the laughers were getting the worst of it; and that W., however he might now and then indulge himself in whimsical tricks, was really a man of true and lofty genius, against whom ridicule could not permanently avail. The critics' occupation was not yet, indeed, quite gone; and the appearance, 1819, of *Peter Bell*, a poem not without profound merits, but unhappily with a donkey for its hero, allowed them to resume their advantage a little. But, on the whole, the day of idle jeer was over; the tide of genuine appreciation had set in, and it continued steadily, till, long before his death, W. found himself recognized as at the head of the poetical literature of his country. His later days were passed serenely in honor. In 1839 the Univ. of Oxford conferred on him its honorary degree D.C.L. In 1842 a pension of £300 per annum was assigned him by govt.; on receipt of which he ceded, in favor of his son, his situation as distributor of stamps; and on the death of his friend Southey, 1843, he succeeded to the vacant laureateship. Seven years later his serene life came to a peaceful end.—His nephew Christopher W. (q.v.) became bp. of Lincoln 1869. Another nephew, Charles W. (q.v.), became bp. of St. Andrews.—It remains only to enumerate the publications of W. not included above. In 1815 appeared *The White Doe of Rylstone*, followed by *The Waggoner*, and a series of *Sonnets on the River Duddon*. In 1822 he published *Memorials of a Tour on the Continent*; afterward, his *Ecclesiastical Sonnets*; and 1835 *Yarrow Revisited, and Other Poems*, the fruit of a tour to Scotland, memorable by his mournful parting, at Abbotsford, with the dying Scott, which he records in a beautiful sonnet. In 1842 he issued a collected ed. of his works, rearranged as we now have them, in a somewhat fanciful fashion of his own. Shortly after his death was published *The Prelude*, a long autobiographical poem, in blank verse.

By remanding poetry to truth and simplicity of natural feeling as its basis, W. did more perhaps than any other



## WORE.

writer of his time to forward the great revival of English poetry in the opening of the 19th c. But he was scarcely the originator of the movement; the new influence was 'in the air;' already Cowper in England, as in Scotland Burns, had preluded to the melodious outburst which was to follow; and W. has recorded in a well-known stanza his obligations to Burns particularly, as his early guide and exemplar. With the charm of natural simplicity of manner, common to him with these his predecessors, W. combined a depth of philosophic meditation peculiarly his own; there was born with him, moreover, a passionate susceptibility to effects of beauty in the material world, such as few men can ever have been gifted with; and out of these blended elements arose that mystical communion with nature which pervades the whole body of his poetry and constitutes its truest claim to originality. By diffusion of this, and otherwise, his influence on subsequent English poetry has perhaps been as profound as any of the kind ever exercised, and it has been beneficial. Yet we need not admire all that we find in him. The early ridicule directed against him, though it sinned by excess and disproportion, was really to a great extent deserved. Had he gone on writing nothing but the *Betty Foy*s and *Alice Fells* which Jeffrey laughed at, his biography would not have been needed here. It is despite a good deal of this kind of perverse drive!, that he is revered. See the memoir by his nephew, Bp. Wordsworth; criticisms by Coleridge, Matthew Arnold, Myers, Shairp, Hutton; also Transactions of the Wordsworth Soc. Knight's complete edition of W. began to appear 1882.

WORE, v. *wōr*: pt. of WEAR.

## WORK.

**WORK**, n. *wérk* [Goth. *vaurkjan*, to work, to do: AS. *weorc*; Dan. *verk*; Dut. *werk*; Icel. *verk*; Ger. *werk*, work, labor: OHG. *wurcho*, a laborer: Gr. *ergon*, labor]: effort expended in the accomplishment of something; physical or mental labor; toil, whether mental or bodily; operation; employment; something to do, especially as a means of earning a livelihood; that on which labor is expended or on which one is employed or engaged; that which is produced by expenditure of labor; a literary, musical, or artistic production; a building, dock, fortification, or other engineering structure; design or pattern; embroidery; the figures wrought with the needle in embroidery, or the stuff on which the needle is used; action; treatment or management; feat; achievement; a large factory or other similar establishment, commonly used in the plural in this sense, but with a singular article, as a salt-*work*, a large engineering *works*: V. to put forth exertion in accomplishment of something; to labor or toil; to be employed, especially in earning a livelihood, as, 'if a man will not *work*, neither shall he eat,' to act; to operate or be effective; to perform the function intended or expected, as, the medicine did not *work*, the plan did not *work*; to be in action or agitation; to ferment, to cause to labor or toil, as to *work* a horse too hard; to prepare by labor; sometimes with *up*, as to *work up* the material; to turn to account by labor or effort; to operate or exploit, as, to *work* a mine; to do or accomplish; to effect, as, to *work* wonders; to perform the necessary steps in solving, as to *work* a sum in decimal fractions; to decorate as by embroidery or the like, as, to *work* a pair of slippers for a birthday present; to sew. **WORK'ING**, imp.: **ADJ.** acting; operating; devoted to bodily toil; fermenting: **N.** motion; operation; fermentation; in the plu., the parts of a mine or quarry in which operations are or have been carried on. **WORKED**, pp. *wérkt*, labored; managed; fermented. **WROUGHT**, v. *rawt*, another pt. and pp. of *work*. **WORKS**, n. plu. *wérks*, in *mil.*, a general name for walls, parapets, trenches, etc., thrown up for attack or defense; structures in engineering, as docks, bridges, etc.; the buildings and grounds of a manufacturing establishment; the different parts of a piece of mechanism; in *theol.*, moral duties without faith. **WORK'ABLE**, a. -*ă-bl*, that can be worked; practicable; that is worth working. **WORK'ADAY**, a. -*ă-dă*, working-day; laborious. **WORK'ER**, n. -*ér*, one who works. **WORK'MAN**, n. a man employed in manual labor; a mechanic. **WORK'-WOMAN**, a woman engaged in manual labor. **WORK'MANLIKE**, a. -*lik*, becoming a skilful workman; well performed; skilful. **WORK'MANLY**, ad. -*li*: **ADJ.** skilful; well performed. **WORK'MANSHIP**, n. -*shîp*, the style of art or execution, good or bad, shown in any work; that which is effected or produced by manual labor; the skill of a workman. **WORK'-BAG**, a reticule. **WORK'-BOX**, a small box or case for articles used in sewing, etc. **WORK'-FELLOW**, one engaged in the same work with another. **WORK'-FOLK**, persons that labor in certain occupations. **WORK'HOUSE**, a house for the poor and destitute maintained by the parish or town; a poor-house. **WORKING**



## WORK.

CLASSES, those who earn their bread by manual labor; laborers, mechanics, and others receiving weekly wages. WORK'ING-DAY, a day on which ordinary labor or business is carried on, as distinguished from *Sunday* or from the Sabbath-day. WORK'ING-DRAWING, a drawing by an architect, engineer, etc., of the whole, or of a part, of any designed structure, machine, etc., made on a scale large enough to serve as a guide to the workmen in executing the design—moldings and ornamental designs are of the actual size. WORK'ING-HOUSE, in *OE.*, a workshop; a factory. WORK'MASTER, a performer of any work. WORK'SHOP, a place where workmen carry on their employment. FIELD-WORKS, in *mil.*, works erected for a temporary purpose in front of any fortification. WORKYDAY, n. *wèrk'ì-dā*, in *OE.*, a workday: ADJ. in *OE.*, of or pertaining to a working-day. To SET TO WORK, to employ; to engage in any business or labor; to begin work. To WORK OUT, to effect by toil. To WORK UP, to employ materials in the manufacturing of articles; to make way; to stir or excite; to exhaust. To GO TO WORK, to begin labor; to begin operations.—SYN. of 'work, n.': toil; deed; effect.

WORK: the result of a force in overcoming resistance. If we try to lift a ton-weight, however we may fatigue ourselves, we cannot move it, and therefore we do no work. But we can lift with ease a hundred-weight, and then we do more work in proportion as we raise it higher. In lifting coals from a pit, the work done is evidently in proportion to the depth of the pit, and to the weight of the coals raised. We may therefore at once define the *work done by a force as the product of the force into the space through which it moves its point of application in its own direction*, and it is usually measured by engineers, and others who do not require absolute accuracy, in *foot-pounds*, the work required to raise 1 lb. one foot high. If the motion of the point of application be in the *opposite* direction to that of the force, the work is done against the force. If the motion be perpendicular to the direction of the force, no work is done by or against the force. Thus, the work spent in opening a massive gate, or in turning a large fly-wheel or grindstone, has nothing whatever to do with the force of gravity—the body moved, in all these cases, is, as a whole, neither raised nor lowered as regards its distance above the earth's surface. If the direction of the force be oblique to the direction in which the point of application moves, we must resolve the force, by the law of the Parallelogram of Forces (see COMPOSITION OF FORCES), into two components, one *in* the direction of motion, the other perpendicular to it. The former is the working component; the latter, as we have just seen, does no work. A good illustration of this is in the case of raising stones from a quarry by carting them up a series of inclined planes, as contrasted with hauling them up vertically: the work done, in either case, is measured by the product of the weight of the stones, and the height through which they have been raised; and thus, for the same load of stones, it will be the same whichever process is adopted.

This is evident from the property of the inclined plane—viz., that the force required to support a body resting on the plane (which is the force that has to be overcome when we haul it up the plane) is to the weight of the body as the *height* of the plane to its *length*. Hence, this force, multiplied into the length of the plane, gives the same product as the whole weight into the height of the plane; and these are the two quantities of work which we are comparing.

When work is done on a body, there is always an increase of velocity, unless other forces act on the body, so that it does an equal amount of work against them. Thus, if we push a movable body, such as a cart, along a road, the velocity gradually increases, and would increase indefinitely were there no friction and no resistance of the air (forces against which work has to be done), and could we move fast enough to keep continually pushing it, however great its velocity may become. If, on the other hand, by means of a rope and pulley, we raise a stone, if once started, it will ascend uniformly, so long as we pull with a force just equal to its weight, because then as much work is done on the stone by the hand as it does against gravity. If we pull with a force greater than its weight, we do more work on the stone than it does against gravity, and the upward velocity increases; if with a force less than the weight, the stone has to do more work against gravity than is done on it by the rope, and its velocity upward becomes less. The measure of the excess of work done on a body over that which it does against resistance is *the increase of the product of half the mass into the square of the velocity*—i.e., of what was formerly called the *Vis-viva* of the body, what is now called its *Actual*, or preferably, its *Kinetic Energy*: see FORCE. Hence, as it is evident that if a body, or system, be acted on by a set of forces which are in equilibrium, it will have no tendency to lose or to acquire velocity, its kinetic energy will remain unchanged, and therefore *as much work must be done on it by some of the applied forces as it does against the rest, in any displacement so slight as not to change the circumstances of the particular arrangement*. That is, when forces are in equilibrium on a body, if the body be slightly displaced, the sum of the products of each force by the effective component of the displacement of its point of application is zero—the product being positive when the force does work, negative when work is done against it. This is the celebrated principle of *Virtual Velocities*, the term virtual velocity having been, very inconveniently, applied to what we have called above the effective component of the displacement of the point of application of a force. It was often employed as the basis of the whole of Statics, and very curious attempts have been made to give proofs of it (independent of the laws of composition of forces), especially by Lagrange. But the principle of Work, or Energy, of which that of Virtual Velocities is a mere particular case, and which is at once applicable to the whole range of Dynamical Science, is distinctly enunciated by Newton in a Scholium to his Third Law of Motion: see MOTION, LAWS,



OF. His words are memorable, and should be universally known—*Si æstimetur agentis actio ex ejus vi et velocitate conjunctim; et similiter resistentis reactio æstimetur conjunctim ex ejus partium singularum velocitatibus st viribus resistendi ab earum attritione, cohesionem, pondere, et acceleratione oriundis; erunt actio et reactio, in omni instrumentorum usu, sibi invicem semper æquales.* Newton has defined what he means by the velocity of an agent—viz., the component of the velocity of its point of application which is in the direction of the agent. He has also shown what is the measure of resistance arising from acceleration (see VELOCITY); so that, merely using modern terms instead of those employed by Newton, but in nowise altering the scope of the above remarkable passage, we have the following version of it: *Work done on any system of bodies (literally, the parts of any machine) has its equivalent in work done against friction, molecular forces, or gravity, if there be no acceleration; but if there be acceleration, part of the work is expended in overcoming the resistance to acceleration, and the additional kinetic energy developed is equivalent to the work so spent.*

When work is expended in overcoming the resistance to acceleration, i.e., the *Inertia* of a body, we have its equivalent in additional kinetic energy. When it is expended against gravity, as in raising a weight or bending a spring, we have it stored up in a dormant form as *Potential Energy*: see FORCE. When it is expended in overcoming friction, there appears at first sight to be no equivalent; but the comparatively recent researches of Joule (q.v.) and others have satisfactorily accounted for its disappearance, by proving its quantitative transformation usually into heat, sometimes into other forms of molecular energy. But to pursue this point would lead us again to questions already treated at some length under the title FORCE. There is one remark, however, which is important: in compressing a gas, in the receiver of an air-gun, e.g., we can never recover as useful effect all the work expended. The reason is, that a gas is *heated* by compression, so that part of the work spent is converted into this heat, conducted through the metal, and by the principle of *Dissipation of Energy* lost, at least in part, to man. Had we a gas which could not be heated by compression (take the imperfect analogy of a space filled with fine spiral springs), we should recover, by allowing it to expand, all the work expended in the compression.

One other remark remains to be made. It will be noticed that Newton speaks of the action of an agent as the product of the agent and the component *velocity* of its point of application. This is what we now call *Rate of doing Work*, or *Horse-power*. Watt estimated a horse-power at 33,000 foot-pounds per minute, or 550 foot-pounds per second. This is probably too high; but it is constantly employed in engineering calculations. A curious quantity, sometimes employed as regards steam-engines, especially those employed for pumping mines, is the *duty*, which is measured by the number of foot-pounds

DESCRIPTION OF WORK.		Weight raised.	Velocity per Second.	Unit of Work per Second.	Length of Working-day.	Total Work in a Day.
		Lbs.	Feet.	Lbs. x feet.	Hours.	Lbs. x feet.
A man mounting an easy staircase, or an incline, without a load, his work consisting simply in moving the weight of his own body...		143	0.5	71.5	8	2,059,200
A man raising weights by means of a cord and pulley, which renders necessary the return of the cord without a load		39.6	{ 0.66 say 0.67	{ 26.53 }	6	573,048
A man raising weights by his hands		44	0.56	24.64	6	532,224
A man carrying a weight on his back up an easy incline, and returning without a load		143	0.13	18.59	6	401,544
A man raising materials by a wheel-barrow, on an incline of 1 in 12, returning unloaded		132	{ 0.065 0.66 say 0.67	{ 8.58 }	10	308,880
A man throwing earth by a spade a height of 5 feet 4 inches.		5.94		3.98	10	143,280
A man working a pin-wheel or a drum—		132	0.5	66	8	1,900,800
1st, at the level of the axle		26½	2.34	61.8	8	1,779,840
2d, at bottom of wheel						
A man walking and pushing, or drawing horizontally, in a continuous manner		26.4	2	52.8	8	1,520,640
A workman acting upon a winch		17.6	2.5	44	8	1,267,200
A workman pushing and pulling alternately in a vertical direction		13.2	2.5	29	10	1,044,000
A horse harnessed to a carriage going at a walking pace		154	3	462	10	16,632,000
" " at a trot		96.8	7.22	699	4.5	11,323,800
A horse in a mill, at a walking pace		99.0	3	297	8	8,553,600
" " at a trot		66.0	6.56	433	4.5	7,014,600
An ox in a mill, at a walking pace		132	2	264	8	7,603,200
Mule		66	3	198	8	5,702,400
Donkey		30.8	2.67	82.24	8	2,368,512



## WORK—WORKHOUSE.

of work done by a hundred-weight of coal supplied to the furnace. A similar mode of comparison is now applied to steam-engines for agricultural purposes, etc.

The quantity of work which can be got from any machine, human, animal, or other, depends in many cases on the rate at which it is done, or the horse-power actually exerted. An average man can easily work at the rate of a horse-power for a few minutes at a time; but if he were to work at no other rate, he would do very little work in a day. Various singular investigations have been made, both theoretically and experimentally, as to the most profitable rate of doing work, and their results are highly interesting. But to discuss them properly would require more space than we can afford. The table on preceding page, due to Poncelet, gives at least approximate notions of the horse-power employed, and the whole work done, in a working-day, by men and animals variously applying their exertions.—See DYNAMICS, and its Cross-References.

WORK, *wèrk*, HENRY CLAY: song-writer and inventor: 1832, Oct. 1—1884, June 8; b. Middletown, Conn.; son of Alanson W., who in 1841 was sentenced to several years' imprisonment in Mo. for aiding in the escape of fugitive slaves. While a child, W. removed to Ill. with his father. He received a common-school education, became a printer, and while working at his trade studied harmony. His war-songs first brought him into public notice; among them are *Marching through Georgia, Kingdom Coming*, and *Babylon is Fallen*. Of the many other songs that he wrote, *My Grandfather's Clock* and *Lily Dale* are best known. In 1865 he visited Europe, and in 1875 became connected, as composer, with the firm of Root & Cady. W. invented and patented a knitting-machine and a rotary engine. He died in Hartford, Conn.

WORK'HOUSE: a poor-house; an establishment in which paupers are lodged and supported at the expense of the parish or town. The name W. is restricted almost entirely to England and Ireland, *poor-house* being the term commonly used in Scotland and in the United States: see POOR—POOR LAWS.—The earliest mention of workhouses is in stat 13 and 14 Car. II. c. 12, authorizing workhouses to be erected in the cities of London and Westminster, to which rogues and vagabonds might be committed by any two members of the 'Workhouse Corporation,' a Board created by the act, with the view of restraining them from predatory habits, and compelling them to work for their living. The provisions of this act were carried into effect in the reign of William and Mary, when a corporation, headed by the lord mayor of London, fitted up a house in Bishopsgate street as a workhouse, one part of which, called the Keeper's Side, was devoted to the purpose contemplated by the act of Charles II.—viz., the reception of vagrants and disorderly persons, committed by two governors; while in the other part, called the Steward's Side, poor children were lodged, and taught various employments and branches of education. A very few workhouses were afterward erected by local acts; but their

## WORKHOUSE.

general adoption throughout England was provided for first by act 9 Geo. I. c. 7, by which the church-wardens and overseers of the poor in any parish or town were empowered, with consent of the majority of the inhabitants, to establish a W., where the poor were to be lodged and maintained. Two or more parishes might unite in having one W., and one parish might contract for the maintenance of its poor in the W. of another. Under this statute, buildings began to be erected and hired all over the country, with great zeal, for workhouses, in which all the poor were housed, industrious and profligate alike. Outdoor relief, which had been prohibited by the above statute, was reintroduced by 36 Geo. III. c. 23, and before long became the rule under a variety of systems, by which assistance was carried so far as to become a bounty on indolence. The poor-rates rose immensely, and it became the subject of general complaint that the able-bodied outdoor pauper had a degree of comfort which destroyed all stimulus to exertion. The result was the passing of statute 4 and 5 Will. IV. c. 76, which remodelled the whole administration of the poor-law, and greatly extended the W. system in England. The various W. officers, including master, matron, schoolmaster, schoolmistress, nurse, porter, and supt. of outdoor labor, all have their proper functions assigned them. Persons having an order, either from the board of guardians, the relieving officers, or the overseers, are at all times entitled to admission; and in cases of necessity, applicants must be admitted without an order. If the house be full, the master is bound to refer the applicant to the relieving officer, whose duty it is to find him relief elsewhere. Casual poor wayfarers, admitted by the master or matron, are to be kept in a separate ward. By enactments regulating the discipline of workhouses, refusal to work at any suitable employment, intoxication, or other misconduct, is punished with imprisonment and hard labor, not exceeding 41 days. The usual rule, in accordance with which husband and wife are separated, is relaxed when they are above 60 years of age. Persons professing to be wayfarers or wanderers are to be searched on admission, and any money found on their persons is to be applied to the common fund of the union; and an applicant for relief concealing such money is to be punished as a disorderly person. In every W. a register is to be kept of young persons under 16 years of age who are hired as servants or bound apprentices; and the relieving officer is bound to visit them twice a year, and inquire into their food and treatment. A register of religious creeds is to be kept in every workhouse.

A W. of ordinary dimensions accommodates 450 to 700 inmates of both sexes and different ages; others, in populous neighborhoods, accommodate 1,500 inmates. Classification as regards sex and age is important, and is usually well attended to. In some situations the able-bodied inmates work at field-labor within boundary walls. There is no going in and out at pleasure. A W. is a sort



## WORKSHOP REGULATION ACT.

of prison, under stern though not unkind discipline, and the leading principle always held in view is, that the offer of being accommodated shall act as a terror to idly disposed persons who are inclined to seek parish relief. The establishment of a W. really has this salutary effect; where there is no W., the pressure on the poor-rates is generally excessive. A half-empty W. is thought a proof of good poor law management.

**WORKING-PARTY:** body of soldiers detailed or told off for some particular work or labor foreign to their ordinary duties.

**WORKINGTON**, *wèrk'ing-ton*: market-town and seaport of Cumberland, England; on the s. bank of the Derwent, about a mile from its mouth; 7 m. n. of Whitehaven, 311 m. from London by rail. Its harbor, furnished with breakwater and quays, is safe and commodious. To the coal mines in the vicinity the town chiefly owes its prosperity, great quantities of coal being exported; but also iron-foundries, malt-kilns, flour mills, ship-building yards, rope and sail-cloth factories, breweries, and chemical works are in operation. A Sheffield steel-foundry (capacity 3,000 tons of steel per week) was transferred hither 1883, on account of the cost of transit to the seaside. Entered the port (1886) 37 vessels in foreign and colonial trade, of 19,806 tons; 1,687 in coasting trade, of 197,487 tons: cleared 24 foreign trade, of 10,495 tons; 1,682 coasting, of 206,404 tons. Other exports are pig and malleable iron; imports timber, etc.—Pop. (1881) 14,371; (1891) 23,522.

**WORKS, BOARD OF:** board for the management and control of public works and buildings; specifically, the board established in the United Kingdom for that purpose, whose expenses are defrayed from the crown revenues or parliamentary grants. It is more fully styled the Board of Works and Public Buildings; and is composed of a first commissioner, who is a political officer and sometimes has a seat in the cabinet; together with the secretaries of state, and the pres. and the vice-pres. of the Board of Trade, who are *ex-officio* commissioners. The Board of Works has also the management of the parks in the metropolis, and of Richmond, Greenwich, Bushy, Phoenix, and Holyrood parks, and the public gardens at Kensington, Kew, and Hampton Court. Among the duties of the board are the providing of public walks, and access to the national buildings and collections. It is charged also with many arrangements and responsibilities connected with the making of new streets and roads, in London and elsewhere, and the erection and repair of public statues. The Board of Works is under control of the treasury, to whose sanction all large estimates for public works must be submitted. The treasury appoint the sec., clerks, and other officers of the establishment; and with the sanction of the treasury, the commissioners appoint or employ such architects, surveyors, etc., as may be necessary.

**WORKSHOP REGULATION ACT**, in England, 1867; see **FACTORY ACTS**.

## WORKSOP--WORLIDGE.

**WORKSOP**, *wérk'sop* (anciently *Wirkensop*): town of Nottinghamshire, England, 24 m. n. of Nottingham, 16 m. e.s.e. of Sheffield, 146 m. from London; on the right bank of the Ryton, a branch of the Idle, and near the Chesterfield canal, which communicates with the Trent. It is near the n. extremity of Sherwood Forest. The town is generally well built. There is a fine old church in Norman style, with two lofty towers. W. was formerly noted for its Augustine monastery, of which there are now few remains. Much barley is grown in the neighborhood, and malting is extensive. There is some trade in flour, timber, etc. W. is a station on the Manchester Sheffield and Lincolnshire railway.—Pop. (1891) 12,734.

**WORLD**, n. *wérld* [AS. *weorold*, *worold*, *world*; Dut. *wereld*; Fris. *warl*, the world: Icel. *veröld*, the universe, the age or life of man—from *verr*, a man, and *öld*, age, lifetime: Goth. *vair*; AS. *wer*; L. *vir*, a man: OHG. *wer-alt*, the age of man]: the globe or planet on which we live; any celestial orb considered as the scene of interests analogous to those of mankind; the earth; the present state of existence; the enjoyments and cares of the present life; course of life; customs and practices of men; people in general; the public; mankind, or some particular section of mankind, as, the heathen *world*; everything contained in the world; a large and more or less definite division of the globe, as, the new *world*; the whole human race; the ungodly; a great number or quantity; very much or a great deal, as, a '*world* of good;' time, as, '*world* without end.' **WORLD'LY**, a. *-lǐ*, relating to this life; devoted to this life and its enjoyments; having no thought for the future; bent on gain; sordid; vile: AD. after the fashion of the world; with relation to this life. **WORLD'LINESS**, n. *-lǐ-nēs*, the quality of being addicted to gain and temporal enjoyments. **WORLD'LING**, n. one devoted to the world and its pleasure. **WORLD'LY-MINDED**, a. devoted to gain and the pleasures of this life, and regardless of the future. **WORLD'LY-MINDEDNESS**, n. the state or quality of being engrossed with the gains and pleasures of this life. **WORLD'-WIDE**, a. wide as the world. **WORLD-ENGLISH**, n. name given by Melville Bell to a new phonetic system of spelling the English language so as to render its acquirement by foreigners more easy, and to make it available for international use. **ALL THE WORLD**, everybody; everything. **ALL THE WORLD AND HIS WIFE**, everybody, especially everybody of consequence. **FOR ALL THE WORLD**, for any consideration whatever; exactly. **IN THE WORLD**, in possibility. **NEW WORLD**, the continent of America, as distinguished from Europe, Asia, and Africa, which are called the *old world*. **TO GO TO THE WORLD**, to be married; hence, in Shaks., 'a woman of the world' is a married woman.

**WORLIDGE**, *wér'l'ij* (or **WOOLRIDGE**), JOHN: one of the earliest British writers on agriculture and gardening: b. England. He published several works, of which the most important was *Systema Agriculture; the Mystery of Husbandry discovered and laid open* (1669, folio, pp. 326—several editions; 8vo. 1716). W. favored the inclos-



## WORM—WORM FEVER.

sure of waste lands; mixing of different kinds of soils; deep plowing; sowing seed in drills; changing seed 'from dry, hungry, barren land, to rich and fat land;' liberal use of manures; planting of timber and fruit trees; and other improvements on the methods of his time. Among his works were: *Systema Horticulturæ; or the Art of Gardening* (1677); and *The most easy Way of making Cyder* (1678).

WORM, n. *worm* [AS. *wyrm*; Dut. *worm*; Dan. and Sw. *orm*; Goth. *vaurms*; Ger. *wurm*; L. *vermis*, a worm: Lith. *kirmis*; Skr. *krimi*, a worm: Ir. *cruimh*, a maggot]: any long, small, creeping animal entirely without feet, or with very short ones; one of the long, string-like creatures whose body consists of a number of movable rings or joints, and which live in the earth or breed in the intestines, and of which there are many species (see WORMS, or VERMES); a grub; a maggot; *figuratively*, anything that gnaws or torments internally or one's conscience; a thing debased and despised; anything spiral or thread-like, as the thread of a screw; in a *still*, the coil of pipe through which the vapor or spirit runs and is condensed (see DISTILLATION: STILL); a small worm-like cartilage in the tongue of a dog; in *OE.*, a snake or serpent: V. to move like a worm; wriggle; to work gradually and secretly; to undermine or expel by slow and secret means; to cut the worm-like cartilage in the tongue of a dog. WORM'ING, imp. WORMED, pp. *wérmd*. WORMY, a. *wér'm'í*, relating to or abounding with worms. WORM'LIKE, a. *-lík*, resembling a worm. WORM'-EATEN, a. gnawed or pierced by worms; old; worthless. WORM'-POWDER, a medicine for expelling worms from the intestines. WORM'-SHAPED, a. in *bot.*, more or less cylindrical and contorted. WORM'-WHEEL, a wheel having teeth formed to fit into the spiral spaces of a screw, so that the wheel may be turned by the screw. TO WORM ONE'S SELF INTO, to enter gradually by arts and insinuations.

WORM FEVER: popular name for the disease technically known as *Infantile Remittent Fever*. Although it is a disease which presents great differences in its course and symptoms, according to the circumstances which have given rise to it, its characteristic symptoms point to the mucous membrane as the original seat of morbid action. The disease seldom occurs during the first year of life; but from the 2d to the 12th year it is frequent. Premonitory symptoms usually occur, and may last for some days. The child looks ill and loses his color; he is languid or fretful; complains of pain in the head or belly, is drowsy, but rests badly, starting in his sleep, or grinding his teeth. The appetite fails, the tongue becomes loaded, and the breath offensive. Fever now sets in; or the attack may commence with high febrile symptoms, and be ushered in by a cold fit. When once established, the fever is remarkable for the distinctness of the exacerbations, the daily number of which varies in different cases. There is, however, usually one well-marked exacerbation, occurring in the evening, and lasting till morning, and followed by a profuse sweat. Three is a common number—namely, one

in the morning, one in the afternoon, and a third at night. However cool and lively the child may at other times be, it becomes fretful, hot, and heavy, as the exacerbation approaches. During the febrile period, all the symptoms become aggravated. As the period of remission approaches, these symptoms gradually become less severe, and more or less perspiration appears. As the general disease declines, the intermissions become lengthened, while the exacerbations diminish in duration and in intensity. Worms are often present in remittent fever, and give rise to many of the above-named symptoms; but as the symptoms often remain after worms have ceased to be expelled, the latter cannot be regarded as being always the sole cause of this disease.

In treatment of remittent fever, the first point is to improve the condition of the intestinal canal, and to correct the morbid secretions poured into it. 'From the deranged state of the secretions,' says an old physician, 'the occasional use of a mercurial is often very beneficial; and it may be given combined with an aperient or a diaphoretic, according to the circumstances.' He adds that to give cold drinks and keep the body cool by light clothing and the use of an airy apartment (quietness being secured, with occasional exclusion of the light) is essential to recovery. When the bowels are not irritable, a solution of crystals of tartar (bitartrate of potash) given cold, in the form of *Imperial* (see TARTARIC ACID), possesses many advantages, as it acts on the kidneys, while it allays thirst and tends to keep the bowels open. In the more advanced stages, when debility sets in, the mineral acids have been found useful: they can be employed much sooner than quinine; but the latter may occasionally be prescribed at the close of the complaint. If there are decided signs of intestinal inflammation special medical treatment is requisite; when there is mere intestinal irritability, Dover's Powder and the warm bath will give relief. If diarrhea cannot be checked by other means, turpentine, in doses of one or two drops, rubbed up with gum-water, may be tried. In diet, the great point is to avoid giving such food as leaves a bulky, indigestible residue. When convalescence begins, change of air often affords remarkable benefit.

WORM'-GRASS: see SPIGELIA.

WORMS, *worms*: ancient and interesting but decayed town of Hesse-Darmstadt; in a highly fruitful district on the left bank of the Rhine, 20 m. s.e. of the town of Darmstadt; 20 m. n.w. of Heidelberg, and communicating with Mainz and Mannheim by railway. Among its churches, the chief is the cathedral, a massive building in the Byzantine style, with four towers, founded in the 8th, completed in the 12th c. On a hill near the church called the *Liebfrauenkirche*, a highly esteemed wine, called *Liebfrauenmilch*, is grown. The manufacture of polished leather employs 1,200 hands; tobacco is manufactured, and a trade in the wines and the agricultural produce of the vicinity is carried on. W. is one of the oldest cities of



## WORMS.

Germany, and is the scene of the *Nibelungen-Lied* (q.v.). It was occupied by the Romans, destroyed by Attila, and rebuilt by Clovis. It was frequently the residence of Charlemagne and his Carolingian successors, was the place of convocation of many German diets, and was erected into a free imperial city by Emperor Henry V. The most famous diet held here was that at which Luther defended himself before Charles V. and the princes of the empire (commemorated by an imposing monument to Luther erected at W. 1868). The industry and commerce of W. were great during the middle ages, and its pop., as far back as the time of the Hohenstaufens, averaged probably 60,000 to 70,000; and even amounted to 30,000 at the close of the Thirty Years' War; but the town was almost destroyed by the French in the war of 1689; and though soon rebuilt on a smaller scale, it has never recovered its former prosperity. The site of the old town is only partially occupied by the present one, the rest being laid out in gardens. Here, 1743, an offensive and defensive alliance was entered into by Great Britain and Austria with Sardinia. Pop. (1880) 19,005; (1885) 21,903; (1900) 40,705.

WORMS, *wormz*: a diseased condition, chiefly in children, caused by the presence of worms in the intestines. For the natural history of the worms which infest the human subject, and the remedies to be employed for their expulsion, see ASCARIS: ENTOZOA: TAPEWORM: VERMIFUGES: also PARASITES: PARASITIC DISEASES. It is now necessary to refer only to the symptoms usually considered indicative of the presence of worms, especially in children. These symptoms are, however, in reality, only evidence of irritation of the mucous membrane of the intestinal canal, which may be due to other causes than worms, e.g., to the presence of indigestible matter, unhealthy secretions, or a morbid condition of the membrane itself. Indeed, the latter, according to good authority, seems necessary, in many instances, for production of any symptoms, even when worms are present; as they have been passed by children in perfect health, who experienced no inconvenience on their account. Even the evacuation of worms does not prove that the symptoms present were caused by them, though doubtless they are likely to have been aggravated thereby. The worm *may* have been but an accidental accompaniment—a morbid condition of the mucous membrane being the true source of the symptoms. Although all the symptoms commonly referred to the presence of worms may exist without them, yet there is a group of symptoms which with approximate certainty indicate their presence, especially when occurring together. These symptoms are divisible into (1) those dependent directly on the presence of worms in the intestines; (2) those connected with the sympathetic relations of the digestive organs, and due to some form of reflex nervous action.

(1) Worms may be suspected to be present when a child looks pale and grows emaciated, while his belly swells and becomes hard—a gnawing, pungent, or twisting pain being felt in the stomach or about the navel. The appetite

## WORMS.

is variable, at times voracious; the breath is fetid; the bowels are often deranged, being alternately purged or costive, and much mucus passed in the stools. There is commonly picking of the nose, or irritation (often excessive itching) is felt in the lower part of the bowels; and when a child is old enough, he may complain of a sense of sinking or fainting, which seems to attend particularly on the irritation caused by worms. When the symptoms present are not accounted for by disease of the mucous membrane or of the mesenteric glands, there is reason for attributing them to worms.

(2) Among the most marked sympathetic symptoms are those of the head. The sleep becomes unquiet, and the little patient is liable to start up suddenly from slumber; grinding of the teeth is common; the pupils are often dilated, and there may be headache, and sometimes convulsions—symptoms painfully like those of Hydrocephalus (q.v.), but often disappearing on the expulsion of worms. A dry cough, unaccompanied by any signs of disease of the thoracic organs, is regarded as a sympathetic or reflex symptom of worms; and vomiting, hiccough, diarrhea, tenesmus, and bloody stools often accompany their presence. The Round-worm (*Ascaris lumbricoides*) may be present in the small intestine (its ordinary seat) in large numbers without occasioning any disturbance; but when it does give rise to symptoms, the most prominent are sharp colicky pains about the navel, faintness, great emaciation, and voracious appetite. The Thread-worm (*Ascaris* or *Oxyuris vermicularis*) occurs chiefly in the rectum, where it often exists in large numbers looking like bits of cut thread. In a recently voided stool they are seen in rapid motion; hence they are called *Ascarides* [from Greek *askaridzein*, to jump], hence also, probably, the great distress which they occasion as compared with the quiet round-worms. The characteristic sign of the presence of these thread-worms is the itching and irritation in the rectum.

WORMS, or VERMES, *vér'mēz*: general name for a class of elongated creeping creatures with bodies composed of movable rings or joints, and destitute of limbs or with very short ones; until lately treated as a subdivision of the ARTICULATA (q.v.), but now usually forming a separate main division (see ZOÖLOGY). Huxley confines the synonymous terms ARTICULATA and ARTHROPODA to Insects, Myriapods, Arachnidans (see ARACHNIDA), and Crustaceans; and places the higher worms, or *Annelids* (the *Annelida*), with the above classes, in a primary division or sub-kingdom of ANNULOSA; and the less highly organized worms, *Scolecids* (in which he includes the *Rotifera* or wheel-animalcules, the *Trematoda* or flukes, the *Taniadae* or tape-worms, the *Nematoidea* or thread-worms, the *Acanthocephala* and the *Gordiacea*), in a sub-kingdom to which he applies the term ANNULOIDA. The main reasons of his placing the worms under two great subdivisions are: (1) that the Annelids resemble the Arthropoda in the arrangement of the nervous system, which constitutes a ganglio-



## WORMS.

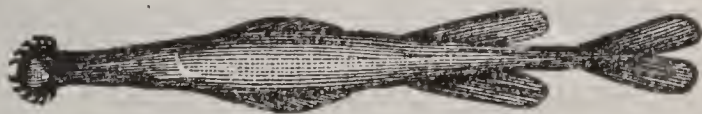
nated double chain, traversed at one point by the œsophagus; (2) none of the Scolecids possess any characters in common with the Arthropoda generally, or with the Annelids, other than those which they have in common with all animals. No scolecid has a definitely segmented body, or bilaterally disposed successive pairs of appendages, nor has it a longitudinal chain of ganglia. These grounds of difference outweigh, in his opinion, the many points of resemblance between the Annelids and the Scolecids—as (1) the resemblance between the ciliated larvæ in many cases; (2) the resemblance between the forms of the mature bodies of many Scolecids with that of one of the most familiar of Annelids, which is so close as to have acquired for the Scolecids the popular name of ‘worms’; (3) the fact that in the Annelids we see the representatives of that singular system of vessels which attains a perfect development in the ‘water-vascular’ apparatus of many Scolecids. The final settlement of the classification of these animals must be decided by further investigation.

With regard to the general characters of W., it is well known that they are usually of very elongated form. In the higher groups the division of the body into a number of segments is very distinct; while in some of the lower forms no segmentation can be detected. The segments, when present, are usually homonomous, or, in other words, are mere repetitions of one another. The soft and contractile body may be cylindrical or slightly compressed, or it may be flat and broad, and usually presents a distinct dorsal and abdominal surface. The lateral region is often provided, in the higher forms, with special appendages, resembling minute stumps, which take part in the respiratory process. Among the cuticular appendages must be mentioned the bristles (*setæ*), hairs, hooks, etc., which are often seen. The nervous system appears in the Scolecids to become more and more rudimentary, till in the parasitic worms it totally disappears. The mouth is absent in the lower forms, but in the higher lies in the mesial line of the abdominal surface, in close approximation to the chief nervous (pre-oral) ganglion, from which most of the organs of the senses derive their nerves, as the eye, the auditory apparatus, and the organs of touch (especially the lips). Some of the parasitic W., e.g., the tapeworms, etc., are totally devoid of an intestinal canal; others, as the Turbellaria (with few exceptions) and the Trematoda, have an intestine, but no anal aperture; while the rest have an intestine provided both with mouth and anus. The latter, when present, lies on the posterior part of the body, and sometimes (as in many Turbellaria) on the dorsal surface. Except in the Gephyrea or Sipunculacea, the intestine, when present, is simple, and devoid of convolutions, but is often, as in the leech, provided with lateral blind sacs. The vascular system in the most highly organized W. consists of a closed system of arteries and veins, presenting modifications in different genera. A large vessel which runs beneath the dorsal integument may be seen under a microscope to contract and propel the blood forward, thus fulfilling the func-

## WORMS.

tions of a heart, and being the homologue of the dorsal vasiform heart of insects; while a corresponding venous trunk conveys the blood in an opposite direction, and runs along the under surface of the body. These great trunks are united at each segment by transverse vessels, which carry the blood from the ventral vein to the dorsal artery. In the *Nematelmia*, or parasitic round-worms, the system is much simpler; and in the lowest W. no trace of true blood-vessels is discernible. None but the *Annelida* (q.v.), or highest W., possess special respiratory organs. These occur in various forms. Thus, in the leech and earth-worm a series of pores on each side of the body lead to as many simple sacculi formed by an inward folding of the integument. In the tubicolous *Annelids*, such as the *Serpula*, the respiratory organs are in the form of long flattened branchiæ, radiating from the head, and generally disposed in a spiral form. When not filled by the red circulating fluid, which the *Annelids* generally possess, they are often beautifully tinted with purple, green, and yellow colors, and form a gorgeous crown. In the *Arenicola piscatorum* (figured in the article *ANNELIDA*) the respiratory organs are seen lying as lateral tufts in the middle part of the body (14 or 16 in number on each side). In the lower W. there are no definite respiratory organs, the process being carried on partly by the surface of the skin generally, and partly by the water-canals noticed in the article *TAPEWORM*. As a general rule, the W. are hermaphrodites, only one of the five classes into which they are divided—viz., the *Nematelmia* having the sexes separate. A large number of the lower kinds are parasitical; the others are inhabitants of sea and fresh water, mud, earth, etc.

The W. are arranged by Carus in the five classes: (1) *Annulata*, corresponding to the *Annelids* of Owen: see *ANNELIDA*. (2) *Gephyrea*, including the *Sipunculus* and its allies: see *SIPUNCULOIDEA*. (3) *Chaetognatha*, including the single genus *Sagitta*, a little fish-like animal with a distinct head, the mouth armed with several pairs of lateral hook-like jaws, with an elongated body furnished with one or two pairs of fin-like organs, and with a broad



Sagitta.

and usually bilobed caudal fin. (4) *Nematelmia*, described in a special article. (5) *Platyelmia* or *Flat-worms*, divisible into the three orders: (1) *Turbellaria*, including the *Planarias*, etc.: (2) *Trematoda*, including the *Flukes*; (3) *Cestodea*, including the *Tapeworms*. (See each of these titles.)

For further information consult works and memoirs of Milne-Edwards, Grube, De Quatrefages (especially *Rambles of a Naturalist*), Schmarda, Blanchard, Leuckart. Darwin's book on *The Formation of Vegetable Mould*



*through the Action of Worms* (1881) contains much as to the habits of earthworms (see EARTHWORM). See also *Monograph of British Annelides*, pub. under the auspices of the Ray Society.

WORMS, or VORMS, *vorms*: island in the Baltic, e. of Dagö, belonging to the Russian govt. of Esthonia; about 36 sq. m. It is flat and generally well wooded in the interior, and throws out numerous steep promontories, round which strong currents run, so that, often for months together, it is cut off from all intercourse with the neighboring islands of Oesel, Dagö, Runö, etc., as well as with the mainland; and thus the inhabitants, who are of Swedish origin, have remained unmixed with foreign elements. A stranger is a surprising rarity on this island; and he, in turn, is not less surprised at the peculiar old Swedish dialect, the architecture, and the manners and customs of this small, poor, but happy insular people.

WORM'-SEED: popular name for *santonica*, from which *Santonin* (q. v.) is extracted.

WORMWOOD, n. *wèrm'wúd* [AS. *wermod*; Dut. *wermoet*; Ger. *wermeth*, wormwood: probably no connection with *worm* and *wood*, but from AS. *werian*, to protect, and *mód*, courage, mind—*lit.*, a mind-preserver]: a plant, *Artemisia absinthium*, possessing intensely bitter, tonic, and stimulating qualities.—*Wormwood* is becoming somewhat naturalized outside of gardens in the United States. It acts not only as an anthelmintic, as its name implies, but it also has tonic and stimulant properties, which prevent



Wormwood (*Artemisia absinthium*).

the reproduction of worms after their expulsion. An *Infusion of Wormwood*, made by pouring a pint of boiling water over an ounce and a half of the dried plant, letting it stand for an hour, and straining, taken in doses of a couple of ounces once or twice a day, is a very good domestic tonic, and may be prescribed with advantage even in cases where worms are not suspected.

WORN, v. *wörn*: pp. of WEAR.

WORNIL, n. *wèr'nîl* [a dim. from *worm*]: the larva or maggot of an insect found on the backs of cattle; a tumor formed on the backs of cattle by this larva; also WOR'NAL, n, -*nāl*, and WOR'MUL, n, -*mûl*.

## WORRY—WORSE.

**WORRY**, v. *wŭr'ri* [Dut. *worgen*, to strangle, to choke: OHG. *wurgan*; Ger. *würgen*, to choke: Fris. *wergia*, *wir-gia*, to strangle: Dut. *worg*, quinsy]: to choke; seize by the throat or neck with the teeth, as dogs in fighting; to bite at; to mangle with the teeth; to harass with care or anxiety, or with importunity; to tease; to fatigue; to persecute brutally; to be solicitous or anxious: N. the act of worrying; harassing trouble in any matter; a thing which brings irritating care and anxiety. **WOR'RYING**, imp. **WOR'RIED**, pp. *-rĭd*. **WOR'RIER**, n. *-rĭ-ĕr*, one who worries.

**WORSAAE**, *vor'saw-ĕh*, JENS JACOB ASMUSSEN: Danish archæologist: 1821–1885, Aug. 15; b. Veile, in Jutland, where his father was *justitsraad*, or councilor of justice. W. went 1833 to Copenhagen, with the intention of studying theology. Having, however, soon exchanged his theological studies for law, and again as speedily relinquished the latter, he turned his whole attention to the history and archæology of the north, which had long attracted him; and in 1838 he obtained the place of assistant in the Royal Museum of Northern Antiquities at Copenhagen. In 1844 appeared W.'s work, *Runamo og Bravalla Slaget*, in which he definitely settled the long-pending question as to the Blekinge rock inscriptions, showing that the supposed runes were no runes at all, but mere weatherings of the rock; and consequently that the interpretations of them by scholars were purely imaginary. This bold but conclusive solution of a problem which had long occupied the most learned men of the north placed W. in the foremost rank of northern archæologists. The Danish government defrayed the expenses of several of his journeys of research, whose results were the publication of numerous works and papers—e.g., *Minder om de Danske og Nordmændene i England, Skotland og Irland* (Copenhagen 1851), or Memorials of the Danes and Norwegians in England, etc. (Eng. transl. 1852); and his treatise *Om en forhistorisk saakaldet tysk Befolkning i Danmark* (Copen. 1849); etc. He published several important works on the archæology of his native country. W. was an ardent patriot, and a strenuous opponent of the spread of German tendencies in the duchies: see his *Jylland's Danskhed* (1850). He was minister of education 1874–5. He died near Holbæk, in the island of Zealand.

**WORSE**, a. *wĕrs* [AS. *wyrs*; Goth. *vairs*; Icel. *verri*; Dan. *værre*; OHG. *wĭrs*, worse]: used as the comparative of the adjectives *bad*, *evil*, and *ill*; bad, evil, or ill in a greater degree; more depraved and corrupt; more sick; not so well; less favorable: AD. in a manner more evil or bad: N. disadvantage; loss, hence 'to put to the worse,' to defeat, as, 'Judah was put to the worse;' something less good, as, 'he does not think the worse of him for it': V. in OE., to put to disadvantage. **WORST**, a. *wĕrst* [AS. *wyrsta*; Icel. *verstr*; Dan. *værst*]: superl. degree of *bad*, *evil*, and *ill*; bad, evil, or ill in the highest degree: N. the most evil or calamitous state; the height, in an ill sense: V. to get the advantage over in contest; to defeat. **WORST'ING**, imp. **WORST'ED**, pp. **WORSER**, a. *wĕrs'ĕr*, OE. redundant form of **WORSE**. **WORS'EN**, v. *-n*, to become worse; in OE., to make worse



## WORSHIP—WORTH.

**WORSHIP**, n. *wér'shîp* [AS. *weorthscipe*, state of worth, worthiness—from *weorth*, worthy, honorable, and *-ship*, state of (see **WORTH**)]: honor; dignity; good name; reverence; respect; the reverence, homage, and adoration due to God; the act of paying honors to God; fervent esteem or admiration; submissive respect; a title of honor used in addressing magistrates, etc.: V. to pay divine honors to; to adore; to perform religious service; to honor highly or to excess; to idolize; to honor. **WOR'SHIPPING**, imp.: N. the act of paying divine honors to. **WOR'SHIPPED**, pp. *-shîpt*. **WOR'SHIPABLE**, a. *-ă-bl*, worthy of being worshipped or adored. **WOR'SHIPPER**, n. *-pér*, one who worships; also spelled *worshiper*. **WOR'SHIPFUL**, a. *-fûl*, worthy of honor from his character or dignity; a respectful epithet applied to magistrates, etc. **WOR'SHIPFULLY**, ad. *-lî*, in a worshipful manner; respectfully.—**SYN.** of 'worship, v.': to reverence; revere; venerate; honor; adore.

**WORST**, a. n. *wêrst*: see under **WORSE**.

**WORSTED**, n. *wús'têd* or *wúr'stêd* [from *Worsted*, a village near Norwich, in Norfolk]: thread spun from long combed wool and twisted hard, used for hosiery, and for carpets and various stuffs, such as merino, alpaca, Coburg, paramatta, etc.; also a loose woollen yarn of Berlin wool is a variety used for ornamental needle-work, etc.: **ADJ.** consisting or made of worsted: N. a worsted yarn or fabric (see **WOOLEN AND WORSTED MANUFACTURES**).

**WORT**, n. *wért* [O. Dut. *wort*; Icel. *virtr*; Low Ger. *wört*, wort (see **WORT** 2, of which this is only a particular application)]: the decoction of barley of which beer is made; new beer unfermented or in act of fermentation (see **BEER**).

**WORT**, n. *wért* [Ger. *wurz*, a herb, grass: Icel. and Dan. *urt*, a plant: Goth. *vaurts*, a root]: a plant; a herb; now used only in compound words, as *colewort*, *liverwort*.

**WORTH**, n. *wérth* [AS. *weorth*, price, value: Goth. *vairths*, worth, price: Icel. *verd*, price, money: Dut. *waard*, worthy: Ger. *werth*, worth]: that quality of a thing which gives to it a value; value expressed in terms of some standard of exchange; price; rate; excellence; merit; usefulness; virtue; comparative importance: **ADJ.** equal in value to; as, it is not *worth* the money; deserving of; having an estate or means to the value of, as, he is *worth* a million; in *OE.*, valuable. **WORTH'LESS**, a. *-lës*, without value; without virtue or moral excellence; degraded; in *OE.*, not meriting. **WORTH'LESSLY**, ad. *-lî*. **WORTH'LESSNESS**, n. *-nës*, the quality of being worthless; want of value, excellence, and the like. **WORTHY**, a. *wér'thî*, having worth or excellence; deserving, in a good or bad sense; meritorious; estimable; having qualities suited to; equal in dignity: N. a man distinguished in the service of his country; one who is noted for his eccentricities or peculiarities; in *OE.*, anything which contributes to make worthy or excellent: V. in *OE.*, to render worthy; to aggrandize. **WOR'THILY**, ad. *-thî-lî*, in a manner suited to; according to merit; justly; deservedly. **WOR'THINESS**, n. *-nës*, desert; merit; excellence; virtue.

## WORTH—WORTHING.

WORTH, *v. wërth* [AS. *weorthan*, to become: Dut. *worden*; Dan. *vorde*; Ger. *werden*, to be, to come to pass]: in *OE.*, to become; to betide—now used only in the phrase ‘woe *worth* the day,’ equivalent to ‘woe *be to* the day.’

WÖRTH, *vört*: village of Alsace-Lorraine, at the confluence of the Sauer and the Salzbach; about 10 m. s.w. of Weissenburg. Here, 1870, Aug. 6, the French, under MacMahon, were outflanked and defeated with great loss by the Germans, commanded by the crown-prince, who took 4,000 prisoners. W. suffered considerably during the battle, hand-to-hand fighting taking place in its streets.—Pop. more than 1,000, mostly Protestants.

WORTH, WILLIAM JENKINS: soldier: 1794, Mar. 1—1849, May 17; b. Hudson, N. Y.; of good Quaker family. After a common-school education and a short mercantile experience, he entered the army as 1st lieut. 1813, Mar. 19; served as aide to Gen. Winfield Scott; was promoted capt. for gallantry 1814, Aug. 19; and major for distinction in the battle of Niagara. At the close of the war he became supt. of the U. S. Milit. Acad., lieut.col. 1824, col. 1838, and in the Florida war defeated the Seminoles 1842, Apr. 19. In the war with Mexico he was second in command; was the first to plant the U. S. flag on the Rio Grande; conducted the negotiations for the surrender of Matamoras; was assigned by Taylor to the hazardous undertaking of the assault at Monterey on the bishop's palace; was under Scott on the Gulf coast and in all the battles from Vera Cruz to Mexico; took a chief part in the capture of Puebla; and was the first to enter the City of Mexico and haul down the Mexican flag. His death from cholera occurred while in command of the dept. of Texas. He was brevetted maj.gen. and given swords of honor by congress and by the states of N. Y. and La. A fine monument to his memory was erected in New York city.

WORTHING, *wër'thing*: fashionable and rapidly rising English watering-place on the Sussex coast, 10 m. w. of Brighton, 61 m. s. of London. Its importance began with the 19th c., before which it was a small unvisited fishing-village. The climate is much milder than that of Brighton, the town and its immediate neighborhood being encircled on the n. and n.e. by almost an amphitheatre of hills, which shelter it from northerly winds, and render it one of the best *winter* resorts on the s. coast. The town has little trade or manufacture, but is essentially a place for pleasure-seekers and invalids. It has one of the finest and longest sea-parades in the kingdom, nearly two miles in length. The town has excellent drainage and good water-supply; and its mortality tables show a rate of only 14·5 per 1,000. The neighborhood of W. was chosen by Dr. Richardson as the site of the ideal Hygeia or City of Health shadowed forth by him 1875.—Pop. (1881) 10,976; (1891) 16,606.



## WORTHINGTON—WOULD.

**WOR'THINGTON, HENRY ROSSITER:** inventor: 1817, Dec. 17—1880, Dec. 17; b. New York. He began mercantile life with his father, but about 1840 undertook experiments with steam for propulsion of canal boats. The difficulty of having the boiler kept properly supplied with water when, as in passing through locks, the engine was not in motion, he overcame by substituting for the hand-pump, then in use, a device compelling the idle boiler to work a small steam-cylinder with an attached pump. He patented 1841 the independent feed pump, and this became the direct-acting steam-pump patented 1849. In 1854 he erected at Savannah, Ga., a direct-acting compound condensing-engine, whose success led to the use of this type of engine throughout the country. He next invented the duplex pump, which is largely used. His inventions led to the creation of a large plant for manufacturing pumping machinery.

**WOT**, v. *wõt*: see **WIT**.

**WOTTON, wõt'on**, Sir **HENRY**: English author: 1568, Apr. 9—1639, Dec.; b. Bocton Hall, Boughton Malherbe, Kent. He was educated at Winchester New College and at Oxford. From 1589 to 97 he was on the continent, in the principal cities; his longest residence was in Italy, where he improved his opportunities for learning. Afterward he was sec. of the Earl of Essex in Spain and Ireland. Revisiting Italy, he was sent by the grand duke of Tuscany, 1602, to warn King James of Scotland of a plot against his life; and when James succeeded to the throne of England, Wotton was knighted, was thrice ambassador to Venice, and was sent on other missions. In 1625 he became provost of Eton College, and took orders in the church. He wrote also *Elements of Architecture* (1624); and *The State of Christendom* (1657), giving an account of political intrigues in Europe. Izaak Walton wrote his life, and collected his poems and miscellaneous writings in a volume, *Reliquiæ Wottonianæ*.

**WOT'TON, WILLIAM, D.D.**: English divine: 1666, Aug. 13—1726, Feb. 13; b. Wrentham, Suffolk. His father taught him in his early childhood; and such was his precocity that at 5 years of age he could translate chapters from Latin, Greek, and Hebrew. He entered Cambridge at the age of 10 and graduated at 12, acquainted with 12 languages. He was fellow at Cambridge 1685; chaplain to the Earl of Nottingham and rector of Middleton Keynes 1693; prebendary of Salisbury 1705; and retired to Wales 1714, where he preached in Welsh. He was author of *Reflections on Ancient and Modern Learning* (1694); *A History of Rome* (1701); *Traditions and Usages of the Scribes and Pharisees* (1718), translated from the Mishna; and edited the *Laws of Hoel the Good* (1730), in Welsh and Latin.

**WOULD**, v. *wûd* [see **WILL**]: the pt. of **WILL** (q.v.); wish or wished to; determined to, as, he *would* speak; *familiarly*, wish to do, or to have; should wish; I wish or I pray, as, '*would* to God.' **WOULD-BE**, a. vainly professing to be: N. a pretender.

## WOUND—WOUNDS.

**WOUND**, n. *wónd* or *wound* [AS. *wund*; Dut. *wond*; Icel. *und*, a wound: Ger. *wund*; Goth. *vunds*, wounded]: a cut or similar injury to the skin or flesh; any hurt or injury given by violence; injury; bruise: V. to cut or rend the skin or flesh; to hurt or injure by violence. **WOUND'ING**, imp.: N. hurt; injury. **WOUND'ED**, pp. **WOUND'ER**, n. *-ér*, one who wounds. **WOUND'LESS**, a. *-lēs*, free from wounds; that cannot be wounded. **WOUNDY**, a. *wound'i*, in *OE.*, excessive. **WOUND'ILY**, ad. *-i-lī*, in *OE.*, excessively.

**WOUND**, v. *wound* [see **WIND** 1]: pt. of the verb *wind*.

**WOUNDS**, *wóndz*: injuries or lesions produced by external mechanical force, and involving discontinuity or division of the skin or tissues of the body. Wounds have been classified by surgical writers in various ways, but a good arrangement is that adopted by Sir James Paget in his memoir on 'Wounds,' in Holmes's *System of Surgery*, and is based on their mode of infliction. They are thus divided, first, into *open* and *subcutaneous* wounds: the former including those in which the outer part of the wound is almost or quite as extensive as the deeper part; and the latter all those in which the outer part of the wound is very much smaller than the deeper part. These wounds (especially those of the first kind) may be further divided into (1) *incised wounds*, such as cuts or incisions, including those which remove a portion of the body; (2) *punctured wounds*, such as stabs; (3) *contused wounds*, in which the divided parts are bruised or crushed; (4) *lacerated wounds*, in which there is tearing of the tissues; (5) *poisoned wounds*, in which some poison or venom is inserted; and to these may be added, as a special variety, (6) *gunshot wounds*.

*Simple, open, incised wounds* will be more fully noticed than any of the others, because they have been most fully studied, and in their surgical relations are the most important. In a clean cut, whether made accidentally or in a surgical operation, three things are chiefly to be observed—viz., the opening or gaping by the retraction of its edges, the bleeding, and the pain. The *gaping* of a wound is caused by the retraction of the various tissues which are divided. Of the various tissues, the skin shows the greatest degree of retraction, and then (in the order in which they stand) elastic tissue, cellular or connective tissue, arteries, muscles, fibrous tissues, nerves, and cartilages. In addition to the immediate gaping of fresh wounds, many wounds, if not prevented, will continue to retract for a long time—e.g., in stumps that heal slowly, the limb terminates in a cone, in consequence of the prolonged retraction of the muscles. The *bleeding* from an incised wound depends chiefly on the size and number of the divided vessels, and on their connection with the surrounding parts, but to a certain extent on the previous condition of the wounded part, or on the peculiar constitution of the patient. Gradually, with or without surgical help, the vessels cease to bleed; and then, if the wound be left open, there is an oozing of blood-tinged serous fluid, succeeded gradually by a paler fluid, which collects like a whitish film on the sur-



## WOUNDS.

face, and contains an abundance of white or colorless blood cells, imbedded in a fibrinous (therefore spontaneously coagulating) fluid. The nature of the *pain* cannot be made clear by any description to those who have not felt it; and it is more than probable that a similar wound inflicted on two or three persons would occasion different degrees of pain in each. There are differences also 'in both the kind and degree of pain, according to the place and manner of the wound. Thus, in regard to the skin, wounds of the face and of the extremities of the fingers and toes seem to be among the most painful, those of the back among the least so; and wounds cut from within are less painful than those from without. The skin appears far more sensitive to wounds than any of the deeper structures, except the nerves of sensation themselves; but any part (as periosteum or tendons) may become, by disease or distention, highly sensitive.' The *local consequences* of an incised wound are indicative of inflammation. In the course of an hour or more, the edges of the wound and the adjacent parts become swollen and abnormally sensitive, feel hot and aching; the sutures (if any have been inserted) become tighter, and the edges and intervening spaces gape in consequence of the swelling. These symptoms gradually subside in two or at most four days, unless there is some abiding source of irritation. Except in very severe wounds, no *general consequences* are apparent. In these exceptional cases, e.g., in amputations, a shock and subsequent reaction (for these, see SHOCK) are observed. The duration of this feverish reaction or traumatic fever does not seem to bear any fixed relation to the severity of the injury. Sometimes it subsides within 24 hours; more often, after large wounds, it does not subside for three or four days, when the pulse and breathing gradually return to their natural standard, and the skin becomes soft and cool. The beginning of suppuration often coincides with the subsidence of the fever. If the fever should last more than four or five days after receipt of the injury, there is probably some persistent irritation or some morbid complication.

The *healing* of open incised wounds may be accomplished, according to the high surgical authority above quoted (Paget), in five different ways, if we include those in which the process is assisted by treatment—(1) by immediate union, or (in surgical language) by union by the first intention; (2) by primary adhesion, or union by the adhesive inflammation; (3) by granulation, or by the second intention; (4) by secondary adhesion, or the third intention—i.e., by the union of granulations; (5) by scarring under a scab, the so-called subcutaneous cicatrization. *Healing by immediate union* takes place when the wounded parts, being placed and maintained in contact, first stick together, and then become continuous, without formation of any new material as a connecting medium—e.g., a flap of skin is raised by dissection in the removal of a tumor or a mammary gland, and is then replaced on the subjacent parts; in three days at most, the union may be complete,

without any indication of inflammation, there being no evident efflux of blood, no exudation of reparative material, and no scar. In *healing by primary adhesion*, lymph exudes from both cut surfaces, becomes organized, gradually connects the cut surfaces, and at length forms between them a firm layer of connective tissue, covered with a thin shining cuticle. These steps are well seen after the operation for hare-lip. In *healing by granulation*, the wound becomes coated over with the white film, containing colorless blood-cells, as above described. If these glazed surfaces are brought and kept together, they will probably unite, the film becoming organized, and contributing to form a bond of union; but if the wound be left open the film increases, and takes part in the formation of Granulations (q.v.). We cannot enter into the life-history of these granulations, and can only remark that they are finally developed into a scar, consisting of fibro-cellular or connective tissue, with a superficial layer of epidermis. The completion of the healing is accomplished by the gradual improvement of the scar, in which the connective tissue becomes more perfect in its character, and the cuticle becomes thicker and more opaque. *Healing by secondary adhesion*, or by third intention, 'is accomplished by the union of two granulating surfaces (e.g., those of two flaps after amputation) placed and maintained in contact. In this state the two surfaces simply unite, or else new material, produced from either or both surfaces, adheres to both, is organized into continuity with both, and then unites them.' *Healing by scabbing*, or under a scab, is, according to the same authority, the most natural, and in some cases the best of all the healing processes. In animals it is often observed that if a wound be left wide open, the blood and other exudations dry on its surface, and form an air-tight covering, under which scarring takes place, and which is cast off when the healing is complete. In man, this process is less frequent, because, in the first place, exudations seem to be more often produced under the scab, which detach it and prevent the healing; and, secondly, surgical interference seldom allows this method a fair trial.

Such are the several modes of healing of simple, incised, and all open wounds. We have now to consider the nature of the processes therein concerned. Every wound is followed by more or less tendency to an inflammatory process. This tendency may not proceed beyond an increased sensibility of the part and a slight efflux of blood, and there may be no inflammatory exudation; and this is the best condition for healing by immediate union in which no new material is required; or the inflammatory process may go on to the production of lymph, and then cease—a condition essential to healing by adhesion. In healing by granulation, a very low degree of inflammation (such as is requisite for the effusion of the first materials for granulation) is best; while for healing by secondary adhesion or by scabbing, inflammation must be altogether absent. The due understanding of these relations of inflammation and the healing processes of open wounds affords important



## WOUNDS.

aid as to the *mode of treatment*. Nothing should be done to excite or increase inflammation. So much as may be necessary for some of the modes of healing is sure to occur spontaneously, and more will only do harm; on the other hand, the inflammation excited by the wound does not require special treatment, except in the case of organs (such as the eye, the peritoneum, the lungs, the large joints, etc.) in which serious mischief may be very rapidly induced by inflammation. The position of the wounded part is a subject of considerable importance. 'When comfort has, as far as possible, been secured, the next object should be that the wounded part should be relaxed, so that the edges of the wound may come near or together; that no part, and especially no muscle, should be on the stretch; and that the direction of the wound may be such as will allow fluids to flow away from some part of it.' In the great majority of cases, healing by immediate union, or by primary adhesion, is most desirable, and should be aimed at—the exceptional cases being wounds through many structures, and exposing considerable surfaces of deep-seated bones; deep wounds whose depth far exceeds their length; wounds of which the deeper portions of the sides cannot be kept in good contact; wounds through parts in a very inflamed or otherwise disordered state; and those which are likely to be troublesome from secondary hemorrhage—in all of which there is liability to the collection of blood and other fluids under the closed integuments. In attempting to induce healing by either of these modes, the points to be attended to are: the arrest of the bleeding, the cleansing of the wound, the exact apposition of its edges, and their maintenance in this position, and the exclusion of the whole wound from the air. If the bleeding arise from vessels of considerable size, they must be tied, twisted, and pressed (according to Simpson's plan) or crushed at their ends; but all these means, and especially ligature, should be avoided if possible, because they are impediments to exact union; and spontaneous closure of the vessels by the action of cold air or water, and pressure with dry lint, is preferable. The cleaning of the wound is best effected by allowing a gentle stream of water to flow over it. Soft sponges are sometimes useful for this purpose; but they must be used as dabbing (not as scrubbing) agents, and the greatest attention must be paid to their cleanness: the sponge used for the wounds or sores of one patient should *never* be applied to those of another. Apposition is effected by padding and bandaging, Sutures (q.v.), and adhesive plasters—the former being useful in deep wounds, while the latter two serve for more superficial wounds. Although a simple incised wound, after its sides have been thus brought into complete contact, may be left exposed to the air, some covering to exclude the air is preferable. Whatever is used should be light, not adhesive, and not prone to decomposition—its object being to protect the wound probably from a deleterious action of the air, and more certainly from sudden change of temperature, friction, and dust. Nothing is better for this purpose than lint

## WOUNDS.

soaked in oil, or simple cerate on perforated linen. The following remarks on the dressing of wounds are condensed from Daget's memoir. No general rule can be laid down regarding the time at which any or the whole of the dressings should be removed. In small wounds about the face, union may be complete in two days; but it is not so firm as to be safe from probable accidents, and metallic sutures possess the advantage of exciting so little irritation that they may be left in their places for any length of time, till union is perfectly secure. They should therefore not be removed for four days, or, in the case of large wounds, for a week, or longer. They should not all be removed at once, and those that are removed should be replaced by strips of adhesive plaster; the union or scar must be cleaned most gently, and protected from the plaster with oiled lint. If, on the first dressing, the union or adhesion of the wound is progressing favorably, then it will usually be sufficient to dress it subsequently on every second day; and if all goes well, the union of small wounds may be regarded as safe at the end of a week, and that of larger ones at the end of ten days or a fortnight.

The rules here given for inducing healing by immediate union or by primary adhesion may, in an emergency, be carried out by any intelligent reader. We do not enter on the modes of inducing the forms of healing by granulation and by secondary adhesion, as they ought to be under surgical superintendence; nor do we notice the mode of healing under a scab, because it is simply leaving the wound to nature: the most that is required in this case in the way of auxiliary treatment being to cover the scab with dry cotton-wool, to protect it and the subjacent surface from any causes that may excite inflammation.

Of the other varieties of wounds, it is sufficient to notice the most important points severally peculiar to each variety. Of *punctured wounds*, the most serious are those made with blunt-pointed instruments, such as nails, pitch-forks, iron spikes, etc., for by these the injured parts are not so divided as that they may retract, but are pressed aside with much bruising, and can close again as soon as the instrument is withdrawn; and in this lies the chief danger of these wounds, because blood or other fluids are likely to extravasate into them, and cannot readily escape. These fluids, by decomposing or by mere pressure, may excite inflammation, and thus cause deep and confirmed suppuration and great destruction of tissues. Some of the worst forms of these wounds are those produced by sharp teeth, probably because of the force with which, as they tend to meet, the teeth crush the intervening parts. In *contused wounds*, the great question is, whether their union should or should not be attempted. If union is to be attempted, the rules given for treatment of incised wounds must be followed, especial attention being given to their careful cleansing, the removal of clots of blood, and their warm covering with some soft material, as cotton-wool. When it would be useless, from the extent of the bruises, etc., to attempt union, the following rules should be



## WOUND-WORT—WRACK.

adopted: The part should be kept at rest, and as nearly as possible at its natural temperature. For the latter purpose, and for protection, an excellent dressing is lint or cotton-wool thoroughly soaked in olive-oil and completely fitted to the part. Dry cotton-wool may be applied over this, or oiled-silk. Water-dressing may be similarly applied, or warm poultices; but they are generally less comfortable. Irrigation is, in some cases, very soothing, especially in ragged wounds, but it should be with tepid water. The methods of the dressing, after the first, may be almost the same as for incised wounds. The treatment of *lacerated wounds* is almost precisely the same as that of contused wounds. For *poisonous wounds*, see VENOMOUS BITES. See also GUN-SHOT WOUNDS, in reality only an important variety of contused wounds.

It must be noted that various kinds of wounds are liable to certain complications, of which some are local, and others general or constitutional. Among the former are recurring or secondary bleeding, pain, spasmodic muscular movements, and the presence of foreign bodies; while the latter include defect or excess of reaction, traumatic delirium, fever, erysipelas, pyæmia, etc. For some of these complications, see the special titles; and for the treatment of the remainder, consult Paget's memoir.

WOUND-WORT, n. *wônd*:- the herb Betony; *Stachys Beton'ica*, ord. *Labiātæ*.

WOURLI: see WOORALI.

WOUVERMAN, *wow'vèr-mân* (or WOUVERMANS, *-mâns*), PHILIP: Dutch painter: 1619, May—1668, May; b. Haarlem. From his father, Paul W., historical painter, he inherited a taste for art: after studying with him, he studied with John Wynants. He passed his whole life at Haarlem in the assiduous practice of his art; and though his pictures are now highly valued, he is said to have had little immediate success, and to have lived in poverty, often in the hands of the picture-dealers. His pictures are mostly landscapes of small size, with figures profusely introduced, usually in energetic action. His battle-pieces, in particular, are greatly admired for spirit and vigor. Seven or eight hundred pictures are ascribed to W.; but many of these are probably the productions of his two brothers, JOHN and PETER, who executed subjects somewhat similar: both were artists of considerable merit, but much inferior to Philip. His authentic works show great variety and fulness of incident, vivacious figures, skilful animal-painting, and admirable landscape backgrounds.

WOVE, pt. *wōv*, WOVEN, pp. *wōv'n*, of WEAVE (q.v.). WOVE PAPER, a writing-paper with a uniform surface, and not ribbed like *laid-paper*.

WRACK, v. *rāk* [see WRACK 2]: to tear or rend asunder; to destroy; to break to pieces: N. crash; ruin; destruction. WRACK'ING, imp.: ADJ. ruinous; destructive. WRACKED, pp. *rākt*. WRACK'FUL, a. *fûl*, in *OE.*, ruinous.

## WRACK.

WRACK, n. *rāk* [F. *varcē*, sea-weed, wreckage: Icel. *reka*, to cast, to drive: Dan. *rag*, wreck: Sw. *vrak*, refuse, trash (and see WREAK: WRECK)]: anything cast ashore by the waves, specifically seaweed cast ashore; a sea-plant of the genus *Fucus*, whose stalks are terminated by watery bladders—used for making kelp, and as a manure; also, a sea-plant having long grass-like leaves—collected for packing, and for stuffing mattresses.—*Wrack* is sometimes applied indiscriminately to any of the larger *Algæ* of the sea-shores, but is usually restricted to species of the genus *Fucus* (see FUCACEÆ). *Algæ* of this genus have a leathery, dichotomous, generally flat, linear frond, usually furnished with large air-cells, which are included in the substance of the frond; the spores arranged in tubercles, imbedded in mucus, and collected in *receptacles*, through whose pores they are finally discharged. *F. vesiculosus*, popularly known as *Sea-ware*, *Kelp-ware*, and in Scotland as *Black Tang*, is extremely abundant on rocky shores, growing between high and low water mark, and most plentifully near high-water mark, often struggling for existence on the very upper line, and found even among grass and moss in marshy ground occasionally overflowed by the tide. It is the species chiefly employed in the kelp manufacture, because it is more easily collected than any other. It is of dark olive-green color, sometimes 2 or 3 ft. in length; frond flat, entire on the margin, with central rib; air-cells spherical, in pairs, sometimes as large as hazel-nuts; receptacles solitary, terminal, turgid, compressed, mostly elliptical. Oxen, sheep, and deer eat it, seeking it on the sea-shore in winter when other food is scarce. In Gothland it is boiled and mixed with a little coarse flour as food for hogs. It has been used medicinally in glandular affections, owing its value probably to the iodine which it contains.—*F. nodosus* is another species, sometimes called KNOBBED W., growing nearer to low-water mark than the last, therefore not so often and easily accessible, but esteemed the very best species for the manufacture of kelp. It has veinless fronds, branched in a somewhat pinnated manner, with large solitary egg-shaped air-cells in the central line of the frond. It sometimes attains a length of 6 ft.—*F. serratus* is easily distinguished by its serrated fronds and the lack of air-cells: it is sometimes called BLACK WRACK. It is less useful for kelp than the other species. In Norway it is used as food for cattle, generally sprinkled with a little meal. It is preferred to other species for packing crabs and lobsters to be sent to market, as it keeps them moist, while, having less mucus than the other species, it is less apt to ferment and putrefy. Some other species of *Fucus* are common. The use of W. for manure is of great advantage to farmers on the sea-coast: it is better adapted for light than for clay soils. The effect is beneficial for almost all kinds of crop. The W. ought not to be allowed to lie long in a heap, as it is injured by fermentation, but be applied to the land as quickly as possible, and covered by the plow.



## WRAITH—WRANGLE.

**WRAITH**, *n.* *rāth*: in *Scot.*, an apparition in the exact likeness of a person, and supposed to be seen immediately before death or a little after; an apparition; an unreal image.

**WRANGEL**, *vráng'gěl*, **FRIEDRICH HEINRICH ERNST**, Count von: Prussian soldier: 1784, Apr. 13—1877, Nov. 1; b. Stettin. He entered the Prussian army 1796, as a dragoon; served through the campaigns against Napoleon; was a col. at Waterloo, maj gen. 1823, lieut.gen. 1838; and commanded the second corps of the allied army in the Schleswig-Holstein campaign 1848, and was a part of the time commander-in-chief. He left his position 1848, Sep. 8, to undertake the suppression of the revolution in Berlin, and on his success in this received high honors. He was created a field-marshal 1856, was in the second Schleswig-Holstein war 1864, was for a short time in chief command, until superseded in May by Prince Frederick Charles of Prussia, when W. was made a count. As 'Papa Wrangel,' a veteran of 70 years' service in 1866, he was in his later years one of the curiosities of Berlin.

**WRANGELL**, *vráng'gěl*, **FERDINAND PETROVICH**, Baron von: Russian navigator: 1796, Dec. 29—1870, June 10. Educated for naval service at St. Petersburg, on duty from 1812, and attached to a scientific expedition to the n. and e. 1817, he was given the command 1820 of an expedition to explore the Russian polar seas, and was absent 1820, Nov. 2—1824, Aug. 15. After a journey round the world 1825-27, he became gov. of Russian America (now Alaska), and labored for its development until his recall 1834. He was made rear-admiral 1837, vice-admiral 1847, but resigned 1849 to be pres. of the reorganized Russ. Amer. Co. He re-entered the service 1854, as chief director of the hydrographical dept. of the navy; became chief asst. to the high admiral, Grand-duke Constantine, 1855, member of the council of the empire 1858, and admiral and aide to the czar, Alexander II., 1859. Several publications reporting his travels and observations have appeared in Eng. translations (1840,1).

**WRANGEL LAND**, *ráng'ghél*: island or tract of land of unknown extent in the Arctic Ocean, n. of the e. extremity of the Asiatic coast, and intersected by the meridian of 180° e. long. It was discovered 1867 by Capt. Long of the United States, and named after the Russian explorer Baron von Wrangell (1796-1870), who sought to reach it.

**WRANGLE**, *v.* *ráng'gl* [the frequentative of **WRING**, which see: *Dun.* *vringle*, to twist or entangle]; to dispute angrily; to quarrel with much noise; to bicker; to squabble: *N.* an angry dispute; a noisy quarrel. **WRAN'GLING**, *imp.* *-glíng*: *N.* the act of disputing or contending angrily; altercation. **WRANGLED**, *pp.* *ráng'gld*. **WRAN'GLER**, *n.* *-glér*, an angry disputant; in the *Univ. of Cambridge*, one of the students who pass in the first class of mathematical honors, the first in the list being styled *senior wrangler*, and the others *second wrangler*, *third wrangler*, etc., respectively.

## WRANGLER—WRASSE.

WRAN'GLERSHIP, *n*, *-shĭp*, the honor or position of a wrangler.—*SYN.* of 'wrangle, *n*.': jar; bicker; jangle; altercation; brawl; contest; controversy,

WRANGLER, *răng'glēr*: one of those students at the Univ. of Cambridge who have attained the first class in public mathematical honor examinations. The word *W.* is derived from the public disputations in which candidates for degrees were in former times required to exhibit their powers. The examination is confined to mathematics, pure and mixed; it is conducted by two moderators and two examiners, with an additional examiner. The honor men who compose the mathematical *Tripes* (*q.v.*) number usually about 100, and are divided into three classes—*wranglers*, *senior optimes*, and *junior optimes*, each placed in order of merit. The head of the *tripes* is called the *senior wrangler*. Formerly this was the final result of the *tripes*, and it still holds for the first two parts of the examination; but since 1882, at the end of the third and final part of the examination (six months afterward), at which only the wranglers can compete, the wranglers are divided into three classes, the members of each class being arranged alphabetically. See CAMBRIDGE, UNIVERSITY OF.

WRAP, *v.* *răp* [*prov. Eng. warp*, to wrap up; *Fris. wrappe*, to wrap: a derivative from *warp*]: to cover (a thing or the person) by winding something soft and flexible around it) or to wind or fold (something soft and flexible) around a thing or the person; as, to *wrap* one's self up in a blanket; to *wrap* a thing in paper; to wind or fold together; to involve totally: *N.* a loose outer dress or article of clothing, for occasional use, as in carriage driving or travelling; in *plu.* a collective name for such articles. WRAP'PING, *imp.*: *ADJ.* designed for rolling round or covering: *N.* the act of one who wraps; a cover; that in which anything is rolled up; an envelope. WRAPPED, or WRAPT, *pt.* and *pp.* *răpt*. WRAP'PER, *n.* *-pēr*, one who wraps; that in which anything is inclosed; an envelope; a loose upper garment. WRAPT UP, *comprised*; contained; wholly devoted to or dependent on. WRAPRAS'CAL, *n.* *-răs'kăil* [*wrap*, and *rascal*]: *familiarly*, a kind of coarse upper coat.

WRASSE, *răs*, or ROCK'-FISH: fish of the genus *Labrus*, family *Labridæ* (*q.v.*), of the section having cycloid scales, *Cyclolabridæ* of Müller. The *W.* has spiny fins, large thin scales, and an uninterrupted lateral line. The mouth is protrusible, with thick fleshy lips, folded so as to appear double. The teeth on the jaws are simple, in one or more rows; the lower pharyngeal bones are completely fused together and have broad grinding teeth. The form is somewhat perch-like, with the back more straight. There is a single long dorsal fin, the spines of the anterior portion of which are surmounted by short membranous filaments, the posterior portion having short and split rays. The ventral fins are under the pectorals. The colors are generally very brilliant. The genus *Labrus* contains numerous species, abounding chiefly in tropical seas. They usually frequent rocky shores and are in small shoals,



## WRATH—WREATH.

often hiding under seaweeds. They feed on crustaceans, mollusks, and marine worms. They are often caught by bait intended for other fish, but their flesh is not esteemed. The Ballan W. (*L. bergylta* or *maculatus*) is one of the most common British species: it attains a length of about 18 in. and a weight of more than 3 lbs. It is bluish green, paler on the belly, all the scales margined more or less broadly with orange-red, the blue prevailing in some specimens, and the orange in others. The Cook W. (*L. mixtus* or *variegatus*) is frequent on s. shores of England. Its prevailing color is orange, striped transversely with blue, particularly in the male, the colors of the sexes differing so much that the female has often been described as a distinct species and is generally known as the RED WRASSE. The CORKWING (*Crenilabrus melops* or *tinea*) is about 6 in. long, and of greenish-blue color, varied with yellow. The colors quickly fade after the fish is taken out of the water.—Our Atlantic coast species of the family are the Cunner, Blue Perch, or Bergall (*Ctenolabrus adspersus*), brownish blue with brassy tinge, from Newfoundland to Va., common on rocky shores; and the well-known Tautog (*Hiatula onitis*).

WRATH, n. *ráth* [AS. *wrath*, wroth: Dut. *wreed*, sharp of taste, rough: Sw. *wrede*, wrath: Dan. *wred*, angry]: violent anger; fury; indignation; the effects of great anger; in *Scrip.*, just punishment of an offense or crime. WRATHFUL, a. *-fúl*, very angry; greatly incensed; furious; springing from wrath. WRATHFULLY, ad. *-lí*. WRATHFULNESS, n. *-nēs*, the state of being wrathful. WRATHLESS, a. *-lēs*, without wrath.—SYN. of 'wrath': choler; ire; rage; anger; vengeance; passion; resentment.

WRAWL, v. *rawl* [imitative word]: in *OE.*, to cry as a cat.

WREAK, v. *rēk* [Goth. *vrikan*, to pursue: AS. *wrecan*, to give effect to, to wreak, to revenge: Icel. *reka*, to thrust, repel: Ger. *rächen*, to avenge: connected with WRACK 1]: to execute; to inflict for the purpose of vengeance; to revenge, as to *wreak* a wrong (Shak.): N. in *OE.*, vengeance; passion; a furious fit. WREAK'ING, imp. WREAKED, pp. *rēkt*. WREAK'FUL, a. *-fúl*, in *OE.*, revengeful; angry.

WREAKLESS, a. *rēk'lēs*: an old and erroneous spelling of RECKLESS.

WREATH, n. *rēth* [Dan. *vride*; Sw. *wrida*, to wring or twist: AS. *wræth*, a twisted band; see also WRITHE]: something curled or twisted; a garland; a chaplet: V. in *OE.*, to wreath. WREATHE, v. *rēth*, to twist; to entwine; to interweave; to encircle, as with a garland; to be interwoven; WREATH'ING, imp.: N. act of twisting or encircling. WREATHED, pp. *rēthd*. WREATHLESS, a. *rēth'lēs*, without a wreath. WREATHY, a. *rēth'ī* or *rēth'z*, resembling a wreath; twisted; curled. WREATH'EN, a. *-ēn*, intertwined; twisted; wreathed.

## WREATH—WRECK.

**WREATH**, in Heraldry: twisted garland of silk of different colors, otherwise called a *torce*, on which it has, since the 14th c., been usual to place the crest. The side-view of a wreath thus drawn exhibits six divisions, generally tinctured with the livery colors—that is, the principal metal and color of the shield. Every crest is now understood to be placed on a wreath, except when it is expressly stated to issue out of a chapeau or coronet. A wreath, when represented alone, shows its circular form. A wreath is always understood to be the twisted garland of silk, unless otherwise specified; but wreaths of laurel, oak, ivy, etc., sometimes occur. Ordinaries are occasionally *wreathed*, otherwise called *tortillé*, in which case they are represented as if composed of two colors, twisted as in the heraldic wreath.

**WRECK**, n. *rěk* [Icel. *reka*, to cast, to drive: F. *varech*, what is driven up by the sea: Dan. *vrag*; Dut. *wrak*, shipwreck—*lit.*, that which is *cast* or *driven* ashore (see also **WREAK**)]: that which is cast up on the shore by the waves; the goods, broken timbers, etc., cast ashore from a ship that has been broken up or destroyed at sea, as by collision, tempest, etc.; destruction of a ship caused by its being driven on rocks or on shore by the violence of a tempest, or some similar cause; the remains of anything broken up or ruined, as a ship; ruin; destruction; a shattered condition or something in such a condition, as, 'he is a *wreck*, both physically and mentally: V. to ruin or destroy by dashing on rocks or shoals; to ruin; to suffer ruin. **WRECK'ING**, imp. **WRECKED**, pp. *rěkt*. **WRECKAGE**, n. *rěk'āj*, shipwreck; the broken-up parts and scattered cargo of a ship that has become a wreck; wrecked material of any kind. **WRECK'ER**, n. *-ēr*, one who plunders the goods cast on shore from a wrecked vessel; one who allures ships to destruction by exhibiting false lights and by other means for the sake of plunder; one engaged in the securing of the cargo of a wrecked vessel. **WRECKFUL**, a. *rěk'fúl*, in *OE.*, causing wreck.

**WRECK**, v. n. *rěk*: an obsolete form of **WREAK**.

**WRECK**, in Maritime Law: goods cast ashore by the waves after shipwreck, and left there within the jurisdiction of some country, and subject to common law. A ship also is a *W.* when she is rendered unable to pursue her voyages without repairs exceeding half her value: see **SHIPWRECK**. A sunken vessel is not a *W.*, but *Derelict* (q. v.). In the United States, laws have been enacted by the several states bordering on the sea for the safe-keeping and proper disposition of wreck. Goods found at low-water mark, or between high and low water mark, whether resting or partly resting on the ground, are *W.*, and, if not reclaimed, belong to the owner of the shore. See **SALVAGE: FLOTSAM**.

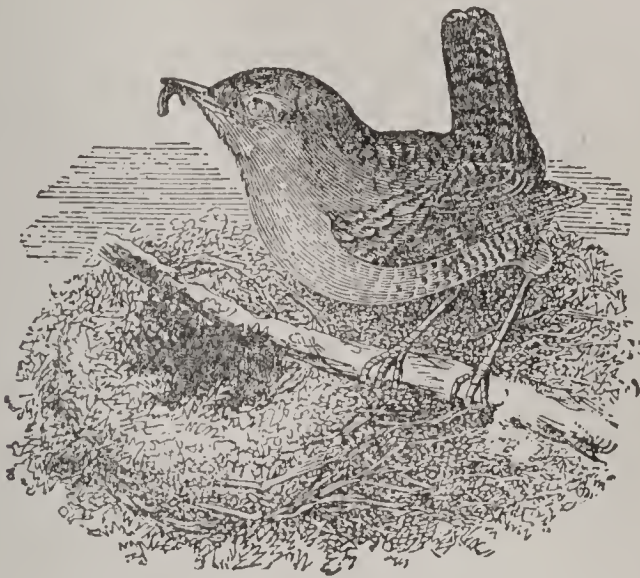


WREDE, *vrä'deh*, KARL PHILIPP, Prince of: Bavarian field-marshal: 1767, Apr. 29—1838, Dec. 12; b. Heidelberg. Belonging to a noble family, he early obtained official employment, and 1793 was elected 'civil commissary' in the Palatinate, accompanying for five years the armies of Wurmser, Duke Albert, and Archduke Charles, in Italy and Germany, and frequently sharing in military operations. In 1799 he led a body of Bavarian volunteers to join Archduke Charles; and for his distinguished conduct in that campaign he obtained, 1800, the grade of maj.gen. After the peace of 1800, he devoted much time and labor to the organization of the Bavarian army; and when war was renewed, found himself at the head of the Bavarian contingent, well disciplined and thoroughly equipped, fighting side by side with his former foes the French; and he was prominent in most of the campaigns against the Austrians, Prussians, and Russians till 1813. But after the retreat from Russia, offended at some real or fancied insults, he returned to Munich, joined the anti-French party, which was headed by the queen and crown-prince; and though his intrigues were stopped by the victories of Lützen and Bautzen, he soon afterward succeeded in bringing about the treaty of 1813, Oct. 8, by which Bavaria joined the coalition against France; and before the end of the same month, he was at the head of 70,000 men. Attacked by Napoleon with an inferior force, W. was, after a bloody and protracted contest, defeated at Hanau. He was chosen soon afterward to command the fourth corps of Schwarzenberg's army, and, though unsuccessful in most of his petty conflicts, contributed to the successful advance on Paris. His services were rewarded 1814 by the dignities of field-marshal and prince, and by the gift of the domain of Ellingen. On the brief renewal of the contest during the 'Hundred Days,' W. was preparing to invade Lorraine, when the battle of Waterloo put an end to the strife. After this period, W. was employed on many important missions, and was charged with the pacification of Rhenish Bavaria during the revolution of 1830.

WREN, n. *rën* [AS. *wrenna*; Icel. *rindill*, a wren]: a small bird of the genus *Troglodytes* and family *Certhiidae* (the creepers), having a slender, slightly curved, and pointed bill, edge of the mandibles entire; wings very short and rounded; tail short and carried erect; legs slender and rather long; plumage generally dull. Wrens are natives chiefly of the n. hemisphere. They live on or near the ground, seeking for insects and worms among low bushes and in similar situations. The House W. (*T. ædon*), all the plumage barred or waved with darker brown, is one of our most common and lively birds. The Winter W. (*T. hiemalis*), s. to the United States in winter, is more reddish, and has the tail less than  $\frac{3}{4}$  the length of the wing. The Carolina W. (*Thryothorus ludovicianus*), the wings barred, otherwise clear red-brown above and pale buff below, is a fine singer; it is found n. to Penn. Of the genus *Cistothorus*, the Long-billed Marsh W. (*C. palustris*) is abundant in reedy wet places, and the Short-billed Marsh

W. (*C. stellaris*) is somewhat rare; both have the back streaked lengthwise, the latter on the whole upper surface.

The European W. (*T. vulgaris*), found in all parts of Europe and in n. Asia, is similar in appearance to the Winter W., and about the same size, 4 inches. It is found even in the arctic regions. Its song is loud and sweet. When driven from bushes, it is easily run down; and the hunting of wrens on St. Stephen's Day is an old custom



Wren and Nest (*Troglodytes vulgaris*).

in s. Ireland. In general, however, it is almost as much a popular favorite in Great Britain as the Redbreast. The name *Kitty Wren* is popularly given to it in many parts of the country. Our House W. is less shy than the European W., and often builds its nest near houses, and in boxes prepared for it. The nests are made to fill the boxes; and to effect this, a large mass of heterogeneous materials is sometimes collected. The song of the House W. is very sweet. The male is a very bold, pugnacious bird, readily attacking birds far larger than itself, as the blue-bird and swallows, and taking possession of the boxes which they have appropriated for their nests. It even attacks cats when they approach its nest.



WREN, *rĕn*, Sir CHRISTOPHER, D.C.L.: renowned English architect: 1632, Oct. 20—1723, Feb. 25; b. East Knoyle, Wiltshire; son of Dr. C. Wren, dean of Windsor; and nephew of Dr. M. Wren, bishop successively of Hereford, Norwich, and Ely. At an early age, young W. was placed at Westminster School, under the celebrated Dr. Busby, and while only in his 14th year was entered a gentleman commoner of Wadham College, Oxford. Here he made considerable progress in mathematical studies, and attracted the notice of the cultivators of physical science—residents or visitors—by his inventions of mathematical instruments, and his zeal and enthusiasm in experimental philosophy. In 1650 he took his degree B.A.; in 1653 M.A.—having been previously made fellow of All Souls.' He now became a member of a society at Oxford for the advancement of natural and experimental philosophy; and 1654 is spoken of by Evelyn, in his *Diary*, as 'that miracle of a youth;' also, in his *Sculptura*, as 'that rare and early prodigy of universal science.' The acquaintance thus begun ripened into a firm friendship between W. and Evelyn.

In 1655 W. greatly assisted in perfecting the barometer, then recently invented. In 1657 he left Oxford for London, where he became Gresham prof. of astronomy; but 1661, May, he returned to Oxford, as Savilian prof. of astronomy. Before leaving London, W., with Lord Brouncker, the Hon. Robert Boyle, Mr. Bruce, Dr. Wilkins, Sir Robert Moray, and others, who used to meet together at Gresham College, had laid the foundation of the Royal Soc. Before the soc. was formally incorporated, the members felt much the absence of W. from their meetings, and one of their first proceedings was to induce the king to lay his commands on him to perfect a design that he had in hand of a globe of the moon, and to 'proceed in drawing the shapes of little animals as they appear in the microscope.' The lunar globe was finished, much to the satisfaction of his majesty, who placed it in his cabinet of rarities. He also summoned W. from Oxford to assist Sir John Denham with his advice on architectural subjects; the poet Denham having been appointed surveyor-gen. of his majesty's buildings, but having little knowledge of the subject.

The study of architecture had had great attention from W. while still a very young man, notwithstanding his devotion to mathematics, astronomy, chemistry, and anatomy. In 1663, as asst. surveyor-gen., he was offered a large salary to go to Tangier, to direct the works at the mole, harbor, and fortifications; but he declined. In the same year W. was engaged by the dean and chapter of St. Paul's to make a survey of the cathedral, with a view to repairs in that vast fabric. He accordingly drew up a very careful and elaborate account of the state of the building, with suggestions for its improvement, and with drawings and designs. All these were laid before the king; but before further steps were taken for the restoration of St. Paul's, that building was levelled to the ground by

the memorable fire of 1666, and W. became architect of the new cathedral, instead of restorer of the old. The first work actually built from a design by W. was the chapel at Pembroke College, Cambridge, 1663. But in the same year he designed the Sheldonian Theatre at Oxford, begun 1664, finished 1669. In 1664 W. designed also some valuable additions to the buildings at Trinity College, Cambridge; particularly the beautiful w. quadrangle, Neville's Court. To this he added, 1666, the Library of Trinity College, said by Gwilt to be 'one of his finest productions, and one with which he himself was well satisfied. It consists of two orders; a Doric arcade below, open to a basement supported by columns, which has a flat ceiling. . . . The principal story is decorated with three quarter columns of the Ionic order, well proportioned.'

In 1665 W. visited Paris, where he made the acquaintance of Bernini, architect of the Louvre, and of other distinguished men. In the following year he returned, to find the Royal Soc. earnestly engaged in searching out the causes of the great plague, so soon to be succeeded by the great fire which laid London in ashes. This disaster at once opened a wide field for W.'s genius. He formed a plan and drew designs for the entire rebuilding of the metropolis, embracing wide streets, magnificent quays along the banks of the river, and other well-considered improvements. In rebuilding London, however, few of W.'s recommendations were adopted. He was chosen to be the architect of new St. Paul's, one of the finest non-Gothic cathedrals in the world; besides which he designed more than fifty other churches instead of those destroyed by the fire. The great Church of St. Paul, on the model of St. Peter's at Rome, was begun 1675, and completed 1710, when the last stone was laid upon the lantern by the architect's son, Christopher: see ST. PAUL'S CATHEDRAL. Of W.'s other city churches, most notable are St. Michael's, Cornhill; St. Bride's, Fleet street (with graceful spire); St. Stephen's, Walbrook, with plain exterior but very elaborate interior—illustrating his judicious method of applying money, when the sum was limited, to some one part or feature (e.g., a spire or a scheme of internal decoration), instead of losing it by hopeless dispersion among all parts of a great structure. W. built also the Royal Exchange, London, 1667; Custom-house, London, 1668; Temple Bar, 1670; the Monument, 1671-77; the College of Physicians, 1674-98; the Royal Observatory, Greenwich, 1675; the Gateway Tower, Christ-Church, Oxford, 1681-2; Chelsea Hospital, 1682-90; Ashmolean Museum, Oxford, 1683; Hampton Court, 1690; Morden College, Blackheath, 1692; Greenwich Hospital, 1696; Buckingham House, 1703; Marlborough House, 1709; the towers at the w. front of Westminster Abbey, 1713; besides the unfinished palace of Winchester, 1683.

In 1672 W. received knighthood. In 1674 he married Faith, daughter of Sir John Coghill, by whom he had a son, Christopher, who survived him; and his wife dying, he married, 1679, Jane, daughter of Viscount Fitzwilliam,



## WRENCH—WRESTLE.

by whom he had a son and a daughter. In 1680 W. was elected pres. of the Royal Soc. In 1684 he was made comptroller of the works at Windsor Castle; and 1685 he was elected grand master of the order of Freemasons. He was also elected a member of the house of commons for New Windsor 1689, and being unseated on petition, was immediately re-elected for the same place. In 1698 he was appointed surveyor-gen. of the works and repairs at the Abbey of St. Peter, Westminster; and in the same year was again elected grand master of the Freemasons. W. died in his chair after dinner, aged 90 years, and was buried in St. Paul's Cathedral, where the appropriate inscription, 'Si monumentum requiris, circumspice,' marks his tomb. During his declining years he was treated with neglect and even injustice by the court of England; 'one Benson' was appointed by George I. to supersede him in the office of surveyor gen.; and some private individuals carped at his works in a malevolent spirit. Steele, however, vindicated the fame of his friend in the *Tatler*, in which W. is introduced in the character of Nestor; and few have been found since that time hardy enough to call in question the well-merited reputation of Sir C. W. as a distinguished architect, mathematician, and scientific observer. As an architect, his power was in the constructive rather than the artistic departments. His grace and fertility of invention in designing steeples have been greatly praised.

**WRENCH**, n. *wrench* [OE. *wrench*, a trick, a sharp turn: Ger. *rank*, intrigue, trick, crookedness: AS. *wrence*, guile, deceit: allied to WRING]: a sudden or violent twist or turn; a sprain; a tool for forcibly turning bolts and nuts: V. to force by twisting or pulling; to sprain; to distort. **WRENCH'ING**, imp. **WRENCHED**, pp. *wrencht*.

**WREST**, v. *wrest* [AS. *wræstan*, to twist, to wrench: Icel. *reista*; Dan. *wriste*, to wrest, to wrench: prov. Ger. *riest*, the wrist (see also WRITHE)]: to twist or extort by violence; to force from by violent twisting; to distort; to turn from its natural meaning: N. distortion; violent pulling and twisting; an instrument like or used like a wrench; a key or hammer used in tuning a stringed instrument; key for tuning a harp. **WREST'ING**, imp. **WREST'ED**, pp. **WREST'ER**, n. *-ër*, one who wrests.

**WRESTLE**, v. *wrestle* [AS. *wræstlian*, to wrestle—from *wræstan*, to twist: O. Dut. *wrastelen*, to wrestle: the frequentative of *wrest*]: to grapple with another and endeavor to throw him; to struggle for the mastery by closing with and endeavoring to throw one's adversary; to strive; to struggle; to contend with: N. a wrestling match. **WREST'LING**, imp. *-ling*: N. the act of one who contests in a trial of strength; an athletic exercise, in which two persons grapple and strive to throw each other; struggle; contention. **WREST'LER**, n. *-lër*, one who wrestles or contends with another in a trial of strength, each contestant grappling with and endeavoring to throw the other either by main strength or by adroit swinging, twisting, etc.

## WRESTLING.

WRESTLING: gymnastic exercise between two contestants, interlocked usually face to face, who strive to throw each other to the ground. It was in high favor with the ancients. The Greeks placed it among the most honorable of the Olympic, Isthmian, and other games; and it was encouraged among the Romans. There are sculptures from Egypt and Nineveh that show the great antiquity of the game. The ancient practice was essentially like the modern, the contestants holding each other in firm grasp, pushing, pulling, interlocking legs, lifting when in closer movements, and in general seeking to control the opponent's legs so as to produce a fall. But the ancients also resorted to means not approved in a fair trial of strength, such as throttling and butting. In the middle ages there are records of matches, such as that in 1222, when representatives of Londoners were victors in contests with the men of Westminster. The prize was sometimes a ram or a cock.—A number of English systems of wrestling have been recognized, and have been to some extent introduced in the United States. In s.w. England the contestants take hold of any part of a strong jacket; for a fair fall, both shoulders and one hip, or both hips and one shoulder, must be on the ground; and the throw must be flat on the back, with no intermediate position of fall, before the contest is decided. In Lancashire the wrestlers seize any part of the body. In the Cumberland and Westmoreland system the contestants stand chest to chest, chins upon right shoulders, each man joining his hands behind his adversary, the right arm of each man passing under the left of the other. If the hold is lost, the game is lost; if both fall simultaneously, the game is renewed, the decision resting on the fall of one before the other. The system includes a variety of expedients for upsetting the competitor, such as that called the 'buttock,' which is twisting so as to make the hip a fulcrum against the other man's body, then by bending lift him from his feet; the 'cross-buttock,' a further twist, bringing the back against his body, and bending as in the first case; the 'back-hank,' in which left leg is passed inside around left leg, and the pull is backward; the 'back-heel,' putting left heel behind the opponent's right heel, forcing his leg up forward, and throwing him backward; the 'left-leg hipe,' and the 'right-leg hipe,' swinging him around, and striking the outside of the thigh against the inside of his; and the 'left-leg stroke' or 'right-leg stroke,' common among boys and unscientific wrestlers, which is simply striking the adversary's leg out on one side while his body is swung in the other direction. No seizing hold of arms, legs, or thighs is allowed in this game, and of course all kicking is ruled out from all civilized practice. The 'catch hold, first down to lose,' is the least objectionable game; the wrestlers must not grip below the waist, and the one who touches ground first with any part of his body is the loser. The boys' game is the front hold, otherwise called square hold, hands on opposite upper arms, and the effort being to swing the opponent suddenly one way while



his leg on the opposite side is pushed out, or else, more effectively, to get one leg behind the opposite one, and throw backward. There is also a game of 'side-hold,' both parties facing one way, and each with an arm around the other's waist; in this the effort is simply to swing suddenly, or, more effectively, to get the knee behind that of the other wrestler, and throw backward.—Wrestling is not the most desirable form of exercise, or of trials of strength. Life-long injuries have resulted, and in some cases immediate death from falls.—See PUGILISM.

WRETCH, *n.* *rěch* [AS. *wræcca*, an exile, a miserable man; *wrecan*, to persecute (see also WREAK)]: a worthless degraded creature; one sunk in the deepest distress; an out-cast; a person sunk in vice; formerly sometimes used as a word of tenderness or fond endearment; ironically in pity, etc., somewhat as 'body,' 'creature,' and 'thing' are now used. WRETCH'ED, *a.* very miserable; unhappy; sunk in deep distress; very poor, mean, or worthless; contemptible. WRETCH'EDLY, *ad.* *-lī*, meanly; poorly. WRETCH'EDNESS, *n.* *-nēs*, extreme misery or unhappiness.

WREXHAM, *rěks'sam*: municipal and parliamentary borough in Denbighshire. and one of the most important towns in N. Wales; 11 m. s.s.w. of Chester, 201 m. from London by rail; on an affluent of the Dee. The town is handsome and lively, and the church, a fine edifice in Perpendicular Gothic, was built about 1470, though its tower, 135 ft. in height, was built 1506-20: this tower has been styled 'one of the seven wonders of Wales.' This church contains a monument and two medallions by Rou-billiac. In the vicinity are several collieries, which, with lead mines, iron-works, paper-mills, and breweries, give employment to the inhabitants. W. has important markets and fairs, one of which, for 14 days in March, is attended by traders of all kinds and from great distances.—Pop. (1871) 8,576; (1881) 10,978; (1891) 12,552.

WRIGGLE, *v.* *rīg'gl* [Low Ger. *wrikken*, to work a thing loose by shaking to and fro: Dut. *wriggelen*, to wriggle: Dan. *wrikke*, to wriggle (see also WRY)]: to move to and fro with short turns; to twist to and fro or back and forth; to put the body into a quick shifting motion; to insinuate or gain by low contemptible means: *N.* a movement as from side to side, with short twists: *ADJ.* in *OE.*, pliant: flexible. WRIG'GLING, *imp.* *-glīng*: *N.* the act of one who wriggles. WRIGGLED, *pp.* *rīg'glđ*. WRIG'GLER, *n.* *-glēr*, one who wriggles.

WRIGHT, *n.* *rīt* [AS. *wyrcean*, to work; *wyrhta*, a workman (see also WORK)]: a workman; one engaged in some mechanical occupation; in *Scot.*, a carpenter; used chiefly in compounds, as *shipwright*, *millwright*.

## WRIGHT.

WRIGHT, *rit*, ARTHUR WILLIAMS, PH.D.: professor of experimental physics: b. Lebanon, Conn., 1836, Sep. 8. He graduated at Yale, A.B. 1859, PH.D. 1861; studied law, and was admitted to the bar 1866; was tutor at Yale 1863-68; studied physical science at Heidelberg and Berlin 1868-9; became prof. of physics and chem. at Williams College 1869; returned to Yale 1872, as prof. of molecular physics and chem.; took charge 1885 of the Sloane Phys. Laboratory, whose construction he had supervised; and from 1887 was styled prof. of experimental physics. He was consulting specialist to the U. S. signal service bureau 1881-86; fellow of the Royal Astronomical Soc. from 1879; member of the National Acad. of Sciences from 1881; and one of the revisers of Webster's Dictionary 1862-64 and 1885-88. He made the earliest observation of the electric shadow 1870-1; investigated ozone 1872-74, and the polarization of the zodiacal light; made the earliest study of the gases in stony meteorites; devised a method 1877 of using the discharge of electricity in a vacuum to deposit the metal of the electrode in transparent films on glass; assisted in observing the total solar eclipse 1878, detecting and measuring with a special form of polarimeter the polarization of the light of the corona; and similarly investigated 1881-83 the light of several comets and of the moon. His device for a standard barometer, and that for distilling mercury in vacuo, have been adopted by the U. S. signal service.

WRIGHT, *rit*, CARROLL DAVIDSON, A.M.: statistician: b. Dunbarton, N. H., 1840, July 25. He left the study of law to enter the army; became col. of the 14th N. H. vols. 1864, and actg. asst. adjt. gen. on the staff of Gen. Sheridan; resigned 1865, and was admitted to the bar the same year; removing to Mass., was state senator 1871-2, chief of the state bureau of statistics of labor 1873-88, supervisor of U. S. census in Mass. 1880, commissioner to investigate the public records of Mass., and chief of the decennial state census 1875 and 85; and since 1885 has been commissioner of the bureau of statistics of labor, till 1903 in the dept. of the interior. In 1902, April, he was made president of the Collegiate department of Clark University, and in October following was a member and recorder of the Coal Strike Commission. He has published a large number of important reports and special works of a statistical character of great value.

WRIGHT, CHAUNCEY: philosophical writer: 1830, Sep. 20—1875, Sep. 12; b. Northampton, Mass. He graduated at Harvard 1852, became a computer for the *Nautical Almanac*, contributed to periodicals able papers on mathematics and physics, was ultimately led to give special attention to advanced scientific and philosophical studies, and gave the fruits of his work in a series of very able essays. He gave a course of lectures on psychology at Harvard 1870, and was instructor in mathematical physics 1874-5. He was rec. sec. of the Amer. Acad. of Arts and Sciences 1863-70. His collected essays, with memoir by Charles Eliot Norton, were published as *Philosophical Discussions* (1877).



## WRIGHT.

WRIGHT, ELIZUR: 1804, Feb. 12—1885, Nov. 21; b. S. Canaan, Conn.: mathematician. He graduated at Yale College 1826; was prof. of mathematics and nat. philosophy in Western Reserve College 1829–33; became sec. of the Amer. Anti-Slavery Soc. 1833; was editorially connected with anti-slavery periodicals in New York and Boston 1834–52; edited the *Railroad Times* and invented a spike-making machine, water-faucet, and improved pipe coupler 1853–58. About 1850 he began giving much attention to the insurance business; 1853 published *Life Insurance Valuation Tables*; 1858 was instrumental in securing the creation of a Mass. state insurance commission; and till 1866 was the commissioner. After that date he was consulting actuary for several life insurance companies. W. devised the accumulation formula; invented the arithmetometer for multiplying and dividing; secured the adoption by the Mass. legislature of the Non-Forfeiture Insurance Act of 1861, and its substitute 1880; was twice pres. of the National Liberal League; actively promoted American forestry; and published a number of poetical, mathematical, and historical works.

WRIGHT, FANNY: see D'ARUSMONT, FRANCES.

WRIGHT, GEORGE FREDERICK, D.D.: Congregational theologian, and geologist: b. Whitehall, N. Y., 1838, Jan. 22. He graduated from Oberlin College (1859) and Theol. Seminary (1862), having been 5 months a private soldier in the civil war while a student. He was Congl. pastor in Bakersfield, Vt., 1862–72, and at Andover, Mass., 1872–81, since which he has been prof. of N. Test. lang. and lit. in Oberlin. Becoming interested in geology, he assisted for a time in the Pennsylvania survey 1881, tracing the terminal moraines of the glacial age from Long Island through that state and westward, and publishing *The Glacial Boundary in Ohio, Indiana, and Kentucky* (1884), since which he has had place on the staff of the U. S. geological survey, spending his summer vacations in investigations of glacial phenomena in the United States and in the n.w. as far as Alaska. He has been called to lecture on the subject before learned societies, and has published *The Ice Age in North America* (1889), and *Supplementary Notes* to the 3d edition of the same (1891). His other works include *The Logic of Christian Evidence* (1880); *Studies in Science and Religion* (1882); *The Relation of Death to Probation* (1882); *The Divine Authority of the Bible* (1884); and *Charles Grandison Finney* (1891). Since 1884, when the *Bibliotheca Sacra* was removed from Andover to Oberlin, he has been its principal working editor.

WRIGHT, HENRY CLARKE. reformer: 1797, Aug. 29—1870, Aug. 16; b. Sharon, Conn. He was among the early anti-slavery agitators and lecturers, and prominent among the speakers at the anniversary meetings of the Amer. Anti-Slavery Soc. in New York, which did so much to arouse the public on the question of slavery. He was also an advocate of peace and of socialism. Later he became a spiritualist, and defended this belief as earnestly as he

## WRIGHT.

had opposed slavery. He was the author of *Man-killing by Individuals and Nations Wrong; A Kiss for a Blow; Defensive War proved to be a Denial of Christianity*; and *The Living Present and the Dead Past*. He died at Pawtucket, R. I.

WRIGHT, HORATIO GOUVERNEUR: soldier: b. Clinton, Conn., 1820, Mar. 6. He graduated second in his class at West Point 1841; served in the engineers, and as asst. prof. of French, later of engineering, 1842-44; was 1st lieut. 1848; superintended construction of forts in Fla.; became capt. 1855; and till the civil war was on duty at Washington as asst. to the chief engineer. He took part in constructing the defenses of Washington, in the battle of Bull Run, and in organizing the Port Royal expedition; and accepted a major's commission in the engineers 1861, Aug., which in the preceding May he had declined in the infantry. He was made brig.gen. of vols. Sep. 15; became maj.gen. of vols. 1862, July 18; successively commanded the dept. of the Ohio, the dist. of Louisville, and a division of the Army of the Potomac. He succeeded Gen. John Sedgwick, 1864, May, as commander of the 6th corps; made an effective movement from Petersburg to check and repel Early's attempt on Washington; rendered distinguished service at Cedar Creek, 1864, Oct. 19; and was the first to break the strong lines at Petersburg, 1865, Apr. 2. He was made lieut.col. U. S. army 1865, Nov. 23, col. 1879, Mar. 4, brig.gen. 1879, June 30; and was retired 1884, Mar. 22.

WRIGHT, JOSEPH: portrait-painter: 1756-93; b. Bordentown, N. J. In 1772 he went with his parents to England, and studied art there and in Paris. Among his sitters for portraits in England was the Prince of Wales. He painted three portraits of Washington—one a three-quarters-length portrait 1783, afterward one for the Count de Solms, and later a miniature profile from life. Washington appointed him first draughtsman and die-sinker in the U. S. mint, and he designed the first coins and medals issued by the national govt. He died in Philadelphia.

WRIGHT, SILAS: statesman: 1795, May 24—1847, Aug. 27; b. Amherst, Mass. After some years of work on his father's farm at Weybridge, Vt., he prepared for college; graduated at Middlebury 1815; studied law, and practiced in Canton, St. Lawrence co., N. Y., where he was county surrogate and held town offices. He was elected to the state senate by democrats 1823, serving 4 years; was a conspicuous opponent of the canal policy of De Witt Clinton, and advocated the ideas of economical state finance to which he usually adhered thereafter. In 1827 he was appointed brig.gen. of militia. He was a member of congress 1827-29, where he supported the protective tariff of 1828, also a motion looking to the abolition of slavery in the Dist. of Columbia. For 4 years from 1829, he was comptroller of N. Y.; and U. S. senator 1833-44. He served on the finance committee, defended the Force Bill, the Clay compromise, and the removal of deposits from the U. S.



Bank, the rechartering of which institution he opposed, opposing also the distribution of surplus revenues among the states. He advocated Van Buren's independent treasury plan of 1840, as a measure of security instead of depositing public moneys in favorite banks; and he opposed the annexation of Texas, though it is said that he voted for it. He aided in reducing all tariff duties, and his last speech in the senate was against the tariff. From a real or politic spirit of economy, he denounced the franking privilege. He contended 1844 that interest should be added in refunding the fine of Gen. Jackson; but 1841 he made a speech against allowing the widow of Pres. Harrison the first full year of her husband's salary, and went so far as to criticise the president's hotel-bills. Under Tyler it is said that Wright was offered a place on the supreme bench, also in the cabinet. Of Martin Van Buren he had always been a friend and adherent since he was a law-student; and when Van Buren was dropped for Polk in the presidential nomination of 1844, the supporters of Polk sought to placate those of Van Buren, in order to save the vote of the state of N. Y.; and therefore the convention gave a nearly unanimous vote to W. for vice-president; but this he peremptorily declined, lest his friends should seem to have required his nomination as a price for selling themselves to the Polk party. He declined Pres. Tyler's offer of the chief-justiceship. Resigning from the senate 1844, Dec., he was gov. of N. Y. until 1847, and, while gov., vetoed an appropriation for improving the state canals; and he called out the military to suppress the anti-renters in Delaware county. Although he had become gov. by a majority of more than 10,000, he was defeated for re-election by a still greater majority in the campaign of 1846. The result has been attributed largely to the presidential aspiration of the sec. of war, William L. Marcy, in conjunction with that of others, and with the southern interest, in order to make impossible W.'s candidacy for the presidency two years later. He survived this reverse less than a year; meanwhile he wrote in favor of the Wilmot Proviso (q.v.), also for expenditures to improve the lake harbors. He retired to his farm in Canton, where he dressed and worked like a farmer, living in rustic simplicity. His last writing was an address for the State Agricultural Soc. He died of apoplexy. A monument was erected to him by his fellow-citizens at Canton; and another, with a medallion bust by Palmer, at Weybridge, Vt. Contrary to slanderous reports, it appears that W. was a temperate man. He was dignified, affable, and kindly; and was esteemed by many of his associates as a man of personal and political integrity. Yet there is no doubt that he was, like other great men of his time, a partizan; and that he was versed, if not always implicated, in all the methods of the 'Albany regency,' so notable for its artful political scheming. The turning of De Witt Clinton, the creator of the Erie canal, out of his last compensating office as canal commissioner, has been by some attributed to W.; it is said that 'he sought to make the

people's party openly support Mr. Clinton, or to cause a breach between this party and Clinton's friends, with the end of electing Mr. Crawford president'—a Georgian of the Virginia school. This, if true, was far from the Cato-like character ascribed to W., and was at the same time inconsistent, as were some other acts of his, with steadfast anti-slavery principle. It should be remembered, however, that W. never claimed to be a steadfast anti-slavery man: he chose and avowed the middle course—not attacking slavery where it lay intrenched within the safeguards of the constitution, but sternly refusing to extend it to new territory. If he had lived, however, he would doubtless have followed Van Buren into the free-soil movement, and probably with more sincerity and persistency.—See *Jenkins's Life*; *Hammond's Life and Times*; and Gillett's *Democracy in the United States*.

WRIGHT, THOMAS: English antiquary and historian: 1810, Apr. 21—1877, Dec. 23; b. near Ludlow, in Shropshire. He was educated in the grammar school of that town, and at Trinity College, Cambridge, where he took his degree B.A. 1834, and subsequently M.A. While at the univ. he contributed to *Fraser's Magazine*, the *Gentleman's Magazine*, the *Literary Gazette*, and other periodicals. In 1836 he came to London, and began the career of a man of letters; and from that time till his death he was continually before the public as author, editor, or translator. In 1837 he was elected a fellow of the Soc. of Antiquaries; and in the following year published his first considerable work, *Queen Elizabeth and Her Times* (2 vols. 8vo). In this year also he was one of the two founders of the Camden Soc., for which he edited various works. In 1843 W., with his friend Roach Smith, founded the British Archæological Assoc. W. was elected 1842 corresponding member of the Institute of France, an honor never before attained by one so young: he was a member also of the Soc. of Antiquaries of France, of the Ethnological Soc. of Paris, of the Royal Soc. of Northern Antiquaries of Copenhagen, and of other learned societies.

W.'s works are said to exceed 100 volumes in number, including translations and works edited for societies: among these works are the following: *Biographia Britannica Literaria* (2 vols., Anglo-Saxon period 1842, Anglo-Norman 1846); *Essays on Subjects connected with the Literature, Popular Superstitions, and History of England in the Middle Ages* (2 vols. 1846); *The Archæological Album, or Museum of National Antiquities—the Illustrations by F. W. Fairholt* (1845); *England under the House of Hanover, Illustrated from the Caricatures of the Day* (2 vols. 1848); *Narratives of Sorcery and Magic* (2 vols. 1851); *The Celt, the Roman, and the Saxon: a History of the Early Inhabitants of Britain down to the Conversion of the Anglo-Saxons to Christianity* (1852, 2d ed. 1861); *Dictionary of Obsolete and Provincial English* (2 vols. 1857); *History of France* (3 vols. 1856–62). The following volumes form part of the series of works published, under the direction of the master of the rolls, in illustration of the mediæval history of Eng-



## WRIGHT—WRIGHTIA.

land: *Les Cent Nouvelles Nouvelles* (2 vols. 1858), being a collection of mediæval tales from the only known manuscript of the same, discovered by W. in the library of the Hunterian Museum, Glasgow; *Essays on Archaeological Subjects* (2 vols. 1861); *History of Domestic Manners and Sentiments in England during the Middle Ages, with Illustrations* by F. W. Fairholt (1861); *A History of Caricature and Grotesque in Literature and Art, with Illustrations* by F. W. Fairholt (1865).

WRIGHT, WILLIAM, PH.D., LL.D., D.C.L.: English orientalist: 1830, Jan. 17—1889; b. Bengal, India. He was educated at the universities of St. Andrews and of Halle; was prof. of Arabic in University Coll., London, 1855, and Trinity Coll., Dublin, 1856–61; asst. in the Brit. Museum 1861; keeper of MSS in the same 1869; and prof. of Arabic at Cambridge 1870 until his death. Besides extensive catalogues of MSS, and editions of Arabic writings, he published the *Book of Jonah in Four Semitic Versions* (1857); a revised *Caspari's Grammar of the Arabic Language* (1859–62); *Contributions to the Apocryphal Literature of the N. Test.*, from Syriac MSS (1865); *The Homilies of Aphractes, the Persian Sage* (1869); *The Apocryphal Acts of the Apostles*, from Syriac MSS (1871); *Fragments of the Homilies of Cyril of Alexandria on the Gospel of St. Luke* (1874); and translations of the *Chronicle of Joshua Stylite* (1882) and the *Book of Kalilah and Dimnah* (1884).

WRIGHT, WILLIAM ALDIS: English librarian and literary editor. A graduate of Trinity College, Cambridge, England, A.B. 1858, A.M. 1861, he became librarian of his college, and its vice-master; and has edited for publication: *Bacon's Essays*; *The Cambridge Shakespeare* (1863–66) Globe Ed. *Shakespeare* (1864); *Bible Word book* (1866); *Generydes: a Romance* (1873–78 Early Eng. Text Soc.); and *Metrical Chronicle of Robert of Gloucester*, Parts I and II. (1887). He prepared the condensed form of Smith's *Bible Dictionary*; has been a contributor to *Notes and Queries*; and has now (1892) brought out a second ed. of *The Cambridge Shakespeare*. This work, in part by other editors in the first ed., now appears with W. as sole editor.

WRIGHTIA, *rî'tî-a*: genus of plants of nat. order *Apocynaceæ*, containing some of the greatest twining shrubs of the E. Indies, such as, attaching themselves in the first instance to trees for support, become themselves at last of tree-like thickness, as well as height, and kill the supporting trees by their choking embrace. The corolla is salver-shaped, with scales in its throat: the fruit consists of two erect follicles. The leaves are simple, generally ovate, or nearly so. The timber of some species, as *W. mollissima* and *W. coccinea*, is valuable. *W. antidysenterica*, native of Ceylon, yields CONESSI BARK, a valuable astringent and febrifuge; *W. tinctoria*, common in many parts of India, yields excellent indigo, and has been recommended for cultivation on this account.

## WRING—WRIST.

**WRING**, v. *rĭng* [AS. *wringan*; Dut. *wringen*, to wring, to press: Low Ger. *wringen*, to twist: Dan. *vringle*; Ger. *ringen*, to twist, to wrest: intimately connected with *wriggle*]: to turn and strain forcibly, as in forcing the water from clothes, etc., after washing; to twist out of place, or connection, as to *wring* the neck of a fowl; to force out, as a fluid, by twisting; to squeeze; to harass; to press with extreme pain; to distort; to persecute with extortion; to bend or strain out of its usual position: N. a forcible twist. **WRING'ING**, imp.: N. a twisting or writhing; the act of pressing and twisting the hands in anguish. **WRUNG**, pp. *rĭng*, also in *OE.*, **WRINGED**, pp. *rĭngd*. **WRING'ER**, n. *-ēr*, one who wrings; a wringing-machine. **TO WRING FROM**, to obtain from by violence or other unfair means; to extort. **TO WRING OFF**, to force off or separate by pressing and twisting. **TO WRING OUT**, to force or squeeze out by twisting. **WRING'-BOLT**, in *ship-building*, a bolt used to bend the planks against the timbers till they are permanently fastened. **WRING'-STAVE**, one of the bars of wood employed in applying the wring-bolts. **WRING'ING-WET**, a. so wet that water may be wrung out. **WRING'ING-MACHINE**, an apparatus for squeezing out the moisture from washed clothes.—**SYN.** of 'wring, v.': to twist; press; writhe; pinch; extort; distress; torture.

**WRINKLE**, n. *rĭng'kl* [O. Dut. *wrinkelen*, to twist, to curl: Dan. *vringle*, to twist, to go unevenly: comp. Gael. *reang*, a wrinkle of the face: *wrinkle* is a dimin. formed from *wring*]: a small ridge or furrow formed on a smooth surface by shrinking or contraction, chiefly applied to the skin of the face; a crease: a fold or rumple in cloth; *familiarly* [AS. *wrence*, a trick (see **WRENCH**)]: a hint; a bit of valuable advice: V. to contract or become contracted into small ridges or furrows; to make rough or uneven. **WRIN'KLING**, imp. *-klĭng*. **WRINKLED**, pp. *rĭng'kld*: **ADJ.** having wrinkles. **WRIN'KLY**, a. *-klĭ*, having a tendency to be wrinkled.

**WRIST**, n. *rĭst* [AS. *wrist*—from *wriþan*, to writhe, to twist: Low Ger. *wrist*, the wrist: Icel. *rist*; Dan. *vrist*, the instep (see **WRITHE**: **WREST**)]: the joint on which the hand turns, and by which it is united to the arm. **WRIST'-BAND**, the band or lower part of the sleeve of a garment which covers or comes down to the wrist. **WRIST'LET**, n. *-lĕt*, a band worn on the wrist: a bracelet; an elastic band on the upper part of a glove which confines the wrist.



## WRITE.

WRITE, v. *rīt* [Icel. *rita*, to write: Goth. *vrīts*, a stroke of a pen: Sw. *rita*, to draw, to trace: Dut. *rijten*, to draw, to tear: Ger. *reißen*, to tear, cut, sketch]: to form characters with a pen or the like on paper or other material; to express by means of forming letters and words; to compose or produce as an author; to tell or communicate by letter; to perform the act of tracing or marking letters or figures in order to represent sounds or ideas; to send a letter or letters; to combine ideas and express them on paper for preservation or for the information of others; to style or designate. WRITING, imp.: ADJ. used or intended for writing: N. the act of forming characters or letters on paper, etc., in order to record ideas for the information of others; anything expressed in letters and words; any written composition; a manuscript; an inscription; a book or pamphlet. WROTE, pt. *rōt*. WRITTEN, pp. *rīt'n*: ADJ. expressed in letters or words; reduced to writing. WRITER, n. *rī'tér*, an author; a clerk or amanuensis; in *Scot.*, a legal practitioner, holding nearly the same position as an attorney in England; a solicitor. WRITERSHIP, n. the office or position of a writer. WRIT, n. *rīt*, that which is written—applied particularly to the Sacred Scriptures, as *Holy Writ*; a legal instr. to enforce obedience to an order or sentence of a court of justice; a mandatory precept issued by a court or other competent authority in the name of the sovereign or the state commanding the person to whom it is addressed to do or refrain from doing some specified act, as a *writ* of ejectment; a *writ* of error; also a judicial process to summon an offender. WRITING-BOOK, a copy-book used by children learning to write; a blank book for the practice of penmanship. WRITING-CASE, a portable case for holding writing materials. WRITING-DESK, a sloping table for writing on; a portable folding-case with a sloping top when spread open for writing on. WRITING-INK, a fluid, generally black, but of other colors, for writing with. WRITING-MASTER, one who gives instruction in writing. WRITING-PAPER, highly sized and glazed paper for writing on, as distinguished from *printing-paper*. WRITING-SCHOOL, a place where writing is taught. WRITING-TABLE, a table of convenient height for writing at, for a library, etc. WRITER TO THE SIGNET, in *Scot.*, one of a society of lawyers equal to first-class attorneys and solicitors in England—usually contracted into W. S.—*Writers to the Signet* were originally clerks in the office of the sec. of state, where the different writs that passed under the king's signet were prepared. An act of 1537 mentions the clerks to the signet as an existing body. The writers to the signet have long been the principal body of law agents practicing before the supreme courts of Scotland; and a large proportion of the conveyancing business of Scotland is in their hands. But Act 36 and 37 Vict. c. 63 has transferred to a newly-created body, called 'Law Agents,' the exclusive right of practicing before both the supreme and the inferior courts of Scotland. See SIGNET.

## WRITERS' CRAMP—WRITHE.

WRITERS' CRAMP, or SCRIVE'NERS' PALSY: peculiar kind of local spasm, in which every attempt to write instantly calls forth uncontrollable movements in the thumb, the index and middle finger, so that the pen starts up and down on the paper, and, instead of a legible handwriting, a mere scrawl results. 'The more,' says Romberg, 'the patient persists in his attempt, the more the difficulty of using his pen increases; and to the visible and sensible contractions of the muscles of the thumb, contractions of the forearm, and even of the upper arm, are often super-added. Abnormal sensations, especially of a sense of weight and constriction of the hand, or of pain extending from the upper arm to the back, are occasionally present. It is diagnostic of these attacks that they are instantly arrested when the individual ceases writing, and that the hand is capable of every other combination of movements and exertions.'—*The Nervous Diseases of Man*, I. 320. The disease is chiefly confined to middle age, and scarcely ever occurs in women; and there can be no doubt that an occupation entailing much writing predisposes to it, the quality of the paper or of the pen having nothing to do with it. The treatment hitherto pursued, both local and general, has, according to Romberg, been 'invariably ineffectual.' This is, however, too strong a term, since he mentions a case in which Stromeyer applied the principle of division of the muscles to the cure of writers' cramp, and in one case a favorable result justified the antispasmodic reputation of tenotomy, the patient being perfectly able to write as early as the 14th day after the subcutaneous division of the tendon of the long flexor of the thumb. The same operation was, however, several times performed by Dieffenbach without success. In some cases judicious treatment, combined with entire cessation of writing for a considerable time, has led to satisfactory results. Galvanism, and the use of strychnia, iron, or conium, also have proved useful.

WRITHE, v. *rīth* [Dan. *vride*; Sw. *wrida*; OHG. *ridan*, to wring or twist]: to turn and twist about; wriggle; to distort; to extort; to wrest; to wriggle and twist about as from pain, etc. WRITHING, imp. *rīth'ing*: N. the act of one who or that which writhes. WRITHED, pp. *rīthd*.



## WRITING.

WRITING: art of fixing thoughts in a palpable and lasting shape, so as to make them known to others. There are two principles employed in this process, either separately or jointly—viz., Ideographism and Phonetism. An ideograph is either a picture of the object the idea of which is to be conveyed, or, at a later stage, some symbol which stands, by common consent, for the object, in which case it is called Symbolism. Phonetism, on the other hand, is either Syllabism—i.e., a combination of consonants and vowels which form a word, or component parts of it—or Alphabetism, a system that further breaks up the syllables into their single component parts of vowels and consonants. All systems of writing seem to have originated in ideographism, and to have gradually arrived at phonetism. The pictorial mode of ideography gradually led, as indicated, to the symbolical mode. The former, called also kyriological [Gr. *kyrios*, principal, proper, the opposite of metaphorical or symbolical] writing, contents itself with representing only bodily things, either by fully or partly depicting them, or by merely indicating them by some special characteristic. The latter—the symbolical mode—represents abstract things in accordance with their similarity to corporeal subjects, as in the hieroglyphs of later Egyptian times. Examples of the real delineations of the subjects, or parts of them, which have been replaced by conventional signs, we find at an early period in Egypt, as well as with the Aztecs, with the primitive Assyrians, in ancient China, and in Guiana. Phonetism here no longer aims at a delineation of subjects or symbols, but of the sounds by which these objects are conveyed to the mind. The first step in phonetic writing is, as we said, the syllabic, which by degrees becomes alphabetical. Difficult though it be in many instances to fix accurately the original ideographic meaning of many of the letters now in use, there is yet absolutely no doubt as to their having once been mere pictures of certain things to which a meaning was attached, the sound of which was in some shape connected with the present value of the letter. Our knowledge of Phœnician, whence our alphabet is directly derived, and of its cognate dialects, enables us, in many instances, to trace them back to their primitive source. Thus, our *A* was originally depicted as the head of an *ox*, a likeness to which may still be traced in its Phœnician form, and its name (Aleph = ox) has still survived in Hebrew and Greek (Aleph or Alpha). This process of the gradual change of a picture into a character is most clearly traceable in the various stages of Egyptian hieroglyphics, which, when written more cursively, assumed such different shapes (in hieratic and demotic respectively) that often there remains scarcely a likeness between different forms of the same characters. Among the ideographic methods there are some, however, which scarcely seem to deserve the name of writing, in the ordinary sense. Such are the Peruvian quipus or knots, which, by changes in color, size, arrangement, and the rest, indicate a certain special sequence of ideas; further, the ‘*khernus*’ or sticks,

which, before the introduction of their present alphabet, the Tartars used to circulate among their tribes, to indicate the number of men and horses to be used for some special expedition. Similar to the Peruvian quipus was (according to the celebrated Chinese work, *I-king*) also the primitive Chinese mode of writing; while the Scandinavian and Germanic runes remind us of the Tartar staves. Of a more advanced stage appears the Mexican Pichne-writing, a system by which single syllables or words were expressed by phonograms. The Chinese system appears to combine both the ideographic and the phonetic characters; but there is scarcely a doubt that even the phonetic signs are derived from ideographic ones. The step to the alphabetic system, however, has not been taken by the Chinese.

When and how our present alphabet was invented, has been a problem from the earliest times. The myths of antiquity ascribed it to Thoth (q. v.) or to Kadmus, which only denotes their belief in its being brought from the East (Kedem), or being perhaps primeval. The Talmud ascribes it to a special revelation. It has been a question whether there were several original alphabetical systems, or whether one is to be assumed as having given rise to the various modes of writing now in use. Thus, three principal sources—Semitic, Chinese, Indian—are given by Klaproth. It is, however, now agreed on all hands that it is the Phœnician character, as we now know it, to which we directly owe our own: see PHŒNICIA. From it many streams have flowed out. The principal of these appear to have been, first, the Semitic, in which the values of the letters have remained almost identical with those of the original Phœnician, except, perhaps, a few sounds added to them in Persian, for expressing certain Indo-Germanic sounds not existing in Phœnician. This class has further been subdivided into Hebræo-Samaritan and Aramaic, the latter embracing the square or modern Hebrew, which is closely allied to the Palmyrene, the Estranghelo or Syriac, the Sabian, the Arabic in its different forms, the Mongol, the Pehlvi, Armenian, etc. The second or central division embraces the writing of Greece, Asia Minor, and Italy, from the Æolo-Doric, Etruscan, Umbrian, Oscan, and other little-known kinds, to the late Pompeian Graffiti. A further group would include the 'Indo-Homerite' characters, and seems to have originated in central Arabia, whence it appears to have spread to Africa and India, where the Magadhi—the oldest variation which the Phœnician assumed here—gave rise to the five families of Devanaghari, Pali, Dravidian, Oceanian, and Tibetan.

Yet, when we speak of the Phœnician as being the mother of all our known alphabets, we must not be understood finally to ascribe to the Phœnicians the original invention of it in the first instance. We only indicate here that the theory to that effect, held by Gesenius and others, will probably, sooner or later, have to give way to the more recent results of De Rougé's investigations, who, with great show of probability, believes the alphabet to have been adapted from certain archaic hieroglyphics of Egypt. It



## WRITING MACHINES.

appears as if at some very archaic period the Phœnicians had borrowed the hieratic signs then in use; as, indeed, the *Prisse Papyrus*, the oldest in existence, exhibits striking similarities with the Phœnician characters. Instead, however, of simultaneously taking the Egyptian names for these characters, they invented new ones according to their own fancy and to the supposed similarity of the characters to some particular thing. The Egyptian origin of the Phœnician character, as confirmed by further researches (see Taylor, *The Alphabet*, 1883), was affirmed of old by Tacitus (*Annal.*, xi. 14)—a curious case of old tradition verified.

Several points of this subject have been treated in the course of this work: see **HIEROGLYPHICS: CUNEIFORM: ALPHABET: ETC.** We only add in this place that the manner of writing is very different with many nations. The Mexican picture-writing begins at the bottom; the Chinese and Japanese, as well as the Mongols, write in columns beginning from the top and going from right to left. The Egyptian hieroglyphics have no fixed direction; but the hieratic and demotic, though the single letters are formed from right to left, always run from left to right; as is also the case in Ethiopic, Cuneiform, and Indo-Germanic languages generally. The Semitic languages have retained the Phœnician mode of writing from right to left—all but the numerals—a mode still retained in archaic Hellenic and Etruscan. By degrees, however, the writer not wishing to return to the beginning of the line, and continuing right underneath the last word penned, a double mode was introduced, called the boustrophedon—as the ox plows. Finally this too was abandoned, and the direction from left to right was followed. For the many various styles of modification that our characters have undergone in the course of ages, the punctuation of the words, and the rest, see **ALPHABET**. The materials and the instruments (see **PAPYRUS: PEN: ETC.**) differed much at various times. Consult Steinthal, *Die Entwicklung der Schrift* (1852); Wuttke, *Geschichte der Schrift* (1872).

**WRITING MACHINES:** appliances to facilitate writing, or to produce copies of MSS. by processes known as type-writing, manifolding, transfer-surface, and stencilling. For an important class of such machines, see **TYPE-WRITER**. Mainfolding processes are those in which at a single writing several copies are produced. A special paper, thin and tough, is usually employed to receive the writing. The production of the characters is effected by paper coated with an easily transferable pigment, which is termed carbon-paper. A typical carbon-paper would be coated with a mixture of lard-oil and bees-wax as a menstruum, mixed with iron-logwood, lake, and Prussian blue, as pigments. In use the thin paper alternates with sheets of carbon-paper, the latter coated on only one side. The message is written on the upper sheet with a hard point of agate, or with a lead-pencil, and the pressure transfers the coloring matter to the interleaved sheets below it, exactly in the line of writing. The identical process is applied to the

## WRITTEN—WRONG.

type-writer, on which 8 or 10 copies can be taken at one striking. Transfer-surface processes are generally conducted by writing out the copy with special ink on paper. The copy is then pressed smoothly upon the prepared surface, which takes off the reverse impression. Clean sheets may be pressed upon the impression, which will yield a large number of copies, each sheet of paper receiving an imprint of the characters. The hektograph, in which the transfer-surface is of gelatine and glycerine, and in which aniline ink is used, is typical. Besides this, zinc and prepared paper have been used as surfaces and lithographer's or printer's inks have been employed instead of aniline colors. Stencil processes generally depend on the production of a paper-stencil plate of the writing. Special thin, hard, sized or waxed paper is used for the stencil. In one machine a stylus carrying at its point a minute wheel is used. The wheel is armed with points like those of a cog-wheel. The stencil paper is placed on a sheet of zinc or other proper surface, and the inscription is traced with the wheel: this perforates the letters with a series of minute dots. On placing the stencil sheet thus prepared over a sheet of writing-paper, and running an inked roller over the stencil, the writing is reproduced. The same stencil may be used for hundreds of copies. Other stencil processes prepare the stencil by placing the paper over a rough surface, such as a piece of file-cut steel, and with a solid pointed stylus the message is written. The result is the perforation of the letters with minute dots corresponding to the passage of the hard steel stylus over the roughened surface. Electricity has been used to make stencils. A handle carries a small motor which projects and retracts with great rapidity a needle-point at the end of the handle. On moving this over the paper, it is perforated as in the other methods, and a stencil sheet is the result. For all processes some nicety of manipulation is required, and the apparatus may be somewhat complicated. The hektograph is perhaps the most simple, but gives only a limited number of copies. For the stencil processes a frame for holding the stencil, hinged so as to swing down upon the bed-plate for printing, and up again to allow the paper to be removed, with inking-roller, ink-slab, and accessories, is furnished, besides the stencil-producing mechanism.

WRITTEN, v. *rīt'n*: see WRITE.

WRIZZLED, a. *rīz'ld* [an adaptation of *grizzle*]: in OE., wrinkled.

WRONG, n. *rōng* [AS. *wrang*, pt. of *wringan*, to wring (see WRING): Icel. *rangr*, crooked, unjust: Dut. *wrang*, acid, harsh: Dan. *wrang*, wrong]: that which is *wrung*, twisted, or turned aside from the right or straight way to the desired end; error; injury; injustice: ADJ. turned aside from a straight line; crooked; not right; unfit; unsuitable; not according to truth: AD. in a wrong manner; amiss; ill: V. to injure; to treat with injustice; to impute evil unjustly to. WRONG'ING, imp. WRONGED, pp. *rōngd*. WRONG'ER, n. *-ér*, one who wrongs or inflicts injury. WRONG'FUL, a.



# WROTE—WRYNECK.

*-fûl*, injurious; unjust. **WRONG'FULLY**, ad. *-lî*. **WRONG'FULNESS**, n. *-nēs*, the state of being wrongful. **WRONG'LY**, ad. *-lî*, in a wrong manner; unjustly. **WRONG'NESS**, n. *-nēs*, the state of being wrong. **WRONGOUS**, a. *rōng'gûs*, in *Scots law*, illegal; not right; constituting a wrong. **WRONG'DOER**, one who does wrong; in *law*, one who commits some wrong for which an action may be brought to recover damages. **WRONG'DOING**, n. evil or wicked actions. **WRONG'HEADED**, a. obstinately wrong in opinion; perverse. **WRONG'HEADEDNESS**, n. the state or quality of being obstinately wrong in opinions.—**SYN.** of 'wrong, a.': injurious; unjust; faulty; erroneous; incorrect; detrimental; criminal; untrue.

**WROTE**, v. *rôt*: pt. and obsolete past participle of **WRITE** (q.v.).

**WROTH**, a. *rawth* [see **WRATH**]: very angry; much exasperated.

**WROUGHT**, v. *rawt*: pt. or pp. of **WORK**. **WROUGHT-IRON**, decarbonized cast-iron; cast-iron rendered tough and malleable by puddling, etc. (see **IRON**).

**WROX'ETER**: see **URICONIUM**.

**WRUNG**, v. *rŭng*: pt. and pp. of the verb **WRING** (q.v.).

**WRY**, a. *rî* [akin to *writhe*: OE. *wrien*, to twist: AS. *wrigian*, to drive]: twisted; turned to one side; crooked; perverted: V. in OE., to bend; to twist abnormally; to writhe; to deviate from the proper direction; to distort. **WRY'ING**, imp. **WRIED**, pp. *rid*. **WRY'NESS**, n. *-nēs*, state of being distorted. **WRY'-MOUTHED**, a. *-mowthd*, having the mouth awry. **WRY'NECK**, a neck distorted or drawn to one side; name of a bird of the genus *Yunx*, allied to the woodpeckers (see below). **WRY'NECKED**, a. distorted; turned to one side.

**WRYNECK**, *rî'nĕk*: bird of the genus *Yunx* (*Inyx*) and family *Picidae* (the woodpeckers); having short, straight, conical beak; long extensile tongue, with a horny point; wings of moderate size; a rather short and rounded tail; feet with two toes in front and two behind. One species, the **COMMON W.** (*Y. torquilla*), is a summer visitant of Great Britain and n. Europe. From its appearing at the same time with the cuckoo, it has acquired the name *Cuckoo's Mate*. It is common in s. England, but very rare in n. parts of Britain. It is about seven inches long, of a rusty ash color, irregularly spotted with brown and black. It feeds on caterpillars and insects, and is often seen on the ground near ant-hills, feeding on the ants and their 'eggs.' The construction of its tongue resembles that of woodpeckers, and enables it to seize its prey with wonderful celerity; the tongue is darted out and retracted, so that the eye can scarcely follow it; the two posterior branches of the bones of the tongue being much elongated, and muscles for its extension attached to them. There is also a long gland on each side of the lower jaw, which secretes a glutinous mucus, so that insects adhere to the horny tip of the tongue. The W., as a rule, makes scarcely any nest, but deposits its

## WUDWAN—WULSTAN.

eggs on fragments of decayed wood in a hole in a tree. The young birds are easily tamed, and are great favorites with boys. The name W. is derived from the habit which the



Wryneck (*Yunx torquilla*).

bird has of writhing its head and neck quickly in various directions, with an undulating snake-like motion, particularly if found in its hole in a tree, making at the same time a hissing noise, so as to alarm the intruder; but on his drawing back, it suddenly darts out and escapes.

WUDWAN, *wūd-wán'*: town of India, in the peninsula of Kattywar, province of Guzerat; 105 m. w.-by-n. from Baroda; on a small river, which falls into the great salt-marsh, the Runn of Cutch. The surrounding district is under high cultivation, and is famed for the excellent cotton which it produces.—Pop. 32,220.

WŪHŪ ('Weedy Lake'), *wó'hó'*: river-port of China: on the Yang-tze; prov. of Ngan-(or An-) Hwuy; opened to foreign trade by the treaty known as the 'Chefoo Agreement,' 1876, between the Chinese and Brit. governments. The foreign trade is as yet inconsiderable.

WULFENITE, n. *wúl-fĕn-īt* [after the Austrian metallurgist *Wulfen*]: a mineral of an orange-yellow color—occurring in short prismatic or pyramidal crystals; the molybdate of lead.

WULSTAN, or WULFSTAN, sometimes WOLSTAN: name of interest in connection with Anglo-Saxon history and literature. Three individuals called W. are specially noticeable.—I. A monk of Winchester in the 9th c., author of a poem, in Latin hexameters, on the miracles of St. Swithin, reputed the best Latin poem of that age produced in England.—II. An archbishop of York, 1003, author of two pastoral letters and several sermons in Anglo-Saxon, the most remarkable of which is printed in Hickes's *The-saurus*, III.—III. The bp. of Worcester, and a saint of the English calendar: about 1007–95; b. Icentum, in Warwickshire; educated at Evesham and Peterborough; became a priest, afterward a monk, and prior of the monastery of Worcester, and 1062 bp. of that sec. He lived through



the troubles of the Norman Conquest, and had the favor of the Conqueror and of William Rufus. He is said by some to have been the author of the portion of Anglo-Saxon Chronicle which extends from 1034 to the death of the Conqueror.

WUNDT, *vünt*, WILHELM MAX: German physiologist: b. Baden, 1832. He studied medicine at Tübingen, Heidelberg, and Berlin; was private tutor at Heidelberg 1857, prof. 1864, and, after a year at Leipzig, prof. of physiology at Zürich from 1874. His works have wide reputation, especially in connection with psycho-physics, or the measurement of the relation of physical stimuli to the resulting mental facts. His *Physiologische Psychologie* (1874) furnished the basis of much of Prof. Ladd's *Physiological Psychology*. The translated titles of Prof. Wundt's other principal works are: *Studies on the Movement of the Muscles* (1858); *Theory of the Perception of the Senses* (1862); *Lessons on the Life of Men and Animals* (1863); *Researches on the Mechanism of the Nerves and the Nerve Centres* (1871-76); *Spiritualism—a Science-like Question* (*wissenschaftliche Frage*) (1879).

WUPPERTHAL, *wúp'ér-tál*: deep narrow valley of Rhenish Prussia (q.v.), named from the river Wupper, or Wipper, a small affluent of the Rhine, which flows through it. The Wupper rises between the towns of Wipperfürth and Hückeswagen, 26 m. n.e. of Cologne. Its course is first n., then n.w., past Barmen (q.v.) and Elberfeld (q.v.)—the chief town on its banks; then s.w. to its junction with the Rhine between Wiesdorf and Rheindorf, 7 m. below Cologne, after a course of 50 m. The waters of the Wupper are very abundant, and supply motive-power for about 400 mills of various kinds. It is navigable for small craft below Solingen (q.v.). The valley of the Wupper is the most actively industrious and most densely peopled in all Germany. Coal is found in abundance.

WURALI, n. *wó'rá-lí*, or WOU'RALI, or WOO'RARI, n. *wó'rá-rí*, or URARI, *ó'rá-rí*: variants of *Woorali* (q.v.).

WURNO, *wér'nō*: town of central Africa, cap. of the Sultanate of Sokoto (q.v.); 18 m. n.e. of Sokoto (the former capital); on the Sokoto, a tributary of the Niger. Barth (1821-1865), the German traveller who travelled in central Africa (1850-55), under the auspices of the Brit. govt., expresses his astonishment at the quantity of cotton brought into the market (see Barth's *Travels and Discoveries in Central Africa* [5 vols. Lond. 1857-8]).—Pop. stated at 12,000 to 13,000.

# WÜRTEMBERG.

WÜRTEMBERG (or WÜRTTEMBERG), *wür'tēm-bērĕh*, KINGDOM OF: European kingdom in the s.w. corner of the German empire; 8° 15'—10° 30' e. long., and 47° 35'—49° 35' n. lat.; bounded w., s.w., and n.w. by the grand duchy of Baden; e., s.e., and n.e. by Bavaria; and s., for a few leagues, by the Lake of Constance and Vorarlberg. Hohenzollern makes a deep indentation into the land from the south, and the entire boundary is very irregular. Detached pieces of territory belonging to W. also lie in the adjacent countries. Its greatest length, from the village of Simmringen, in the n., to the Lake of Constance, in the s., is 139 m.; greatest breadth, from the Katzenkopf, in the Black Forest, e. to the castle of Duttenstein in Neresheim, 105 m.—Pop. (1890) 2,036, 556. The following table gives the area and the population according to the census in 1895:

Circles.	Miles.	(1900).
Neckar. ....	1,285	745,669
Black Forest. ....	1,843	509,258
Jagst. ....	1,984	400,126
Danube. ....	2,419	514,427
Total. ....	7,531	2,169,480

W. is fourth in population of the states of the German empire, after Saxony and before Baden; but is third in point of size, having greater area than Saxony. The total pop. 1900 was 2,169,480.

The cap. is Stuttgart (q.v.). In 1900 the pop. of Ulm was 42,982; Esslingen 27,325; Heilbronn 42,982; the pop. of Stuttgart (1895) 158,231; (1900) 176,699.

*Physical Aspect.*—The surface of W. is composed of terraces of hill and dale, the lowest point being 420 ft. above sea-level. In the Black Forest circle the mountains attain the highest elevation, the Hornisgrinde rising 3,825 ft. One point of the Swabian Alps is nearly 3,000 ft. high. The valleys and plains average 500 ft. elevation. Rich pastures, cultivated fields, orchards, gardens, hills covered with vines, and mountains with forests, give the most diversified scenery. In the s.e. are extensive peat-lands.

*Rivers, Lakes, etc.*—The most important rivers are: the Neckar (q.v.), with its affluents; the Danube (q.v.), which receives the Iller; and the Tauber, tributary of the Main. The Neckar and its streams drain 4,200 sq. m.; the Danube 2,037; the rivers which fall into the Lake of Constance 714; the Tauber 315 and other water-courses 168 sq. m. The only lake in the interior is the Federsee, near Buchau, in the Danube circle. There is much traffic both by steam and sailing vessels on the Neckar, and from Friedrichshaven, on the Lake of Constance.

Railways had been constructed (1900) to the extent of 1,306 m.; telegraphs about 1,750 m. With the exception of 34 m. railways are in the hands of the govt.

*Geology, Mineralogy, etc.*—The prevailing rocks are granite, gneiss, limestone, and various sandstones, Tour-



## WÜRTENBERG.

maline, cobalt, bismuth, silver, malachite, chalcedony, gypsum, copper, rock-crystal, and iron occur. A great variety of fossils have been found. The peat-lands are extensive, and yield annually 450,000 florins. Fire-clay of excellent quality, earths for dyeing, and native sulphate of lime, are worked. Building materials, from the granite of the Black Forest to the tufa of the Alb valley, abound. Clay-band ironstone, yielding 30 to 36 per cent. of iron, is worked in 11 different districts, and salt in five. There are many springs of mineral water, those of Cannstatt and Stuttgart being much frequented.

The climate is mild and healthful, but in the highlands the winters are long and cold. When w. winds prevail, the cold of winter and summer heat are less than in some countries in the same latitude. The greatest quantity of rain falls in summer. Of the total area about 25 per cent. is occupied by plains or level ground, 46 per cent. is hilly, and 29 per cent. mountain-land. The soil is mostly very fertile and well tilled. The vineyards are chiefly in the Neckar circle and that of the Jagst. In 1901 the product of wine was 372,506 hectolitres. The forests, grain, and pasture lands are nearly equally distributed through all the circles. Wheat, oats, barley, rye, potatoes, beans, maize, turnips, mangel-wurzel, lucerne, etc., are principal agricultural products. There are extensive orchards in all parts: cherries, damsons, walnuts, peaches, apricots, and the more common fruits, are largely grown. Timber is largely grown and exported, especially from the Black Forest regions. Large and small cattle are plentifully reared. The live stock (1892) comprised 100,000 horses, 1,000,000 cattle, 500,000 sheep, 290,000 swine, 55,000 goats. Large cattle, which in W. are generally fed in the stall, constitute the principal export of W. to Switzerland and neighboring lands. Forestry and the various branches of agricultural science are diligently promoted by numerous technical institutes.

*Manufactures, Industries, etc.*—The manufactures are chiefly linen, woolen, cotton, and silk fabrics. Wool and cotton spinning, bleaching, dyeing, printing, iron-founding, making machinery, cutlery, gold and silver articles, glass, porcelain, earthenware, tile, cabinet-work, sawing wood, carriage-building, grinding corn, book-printing, and the cognate trades, are principal industries. There are many oil-mills, beer breweries, and brandy distilleries. Water is to a large extent the motive-power in the manufactories and mills. In W., more than 215,500,000 bottles of beer, or 125 for each person, are consumed yearly, besides wine, brandy, and liqueurs. In 1900-1 the total product of beer was 3,876,649 hectorlitres. The total value of land, houses, railways, movables, etc., is reckoned at about \$1,350,000, and the income of the people at about \$137,000,000—\$70,000,000 being from land produce, \$65,000,000 from the industries, and \$2,500,000 from interest on foreign funds. The exports are chiefly grain, cattle, wood, salt, oil, leather, woolen, cotton, and linen goods, beer, etc.

## WURTEMBERG.

*Religion, Language, Education, etc.*—The population of old Würtemberg is almost entirely Lutheran. The numbers of each denomination 1880 are shown in the subjoined table:

Circles.	Evangelical Lutherans.	Roman Catholics.	Other Christians.	Jews.
The Neckar.....	560,740	52,923	3,836	5,288
“ Black Forest...	350,499	119,746	1,001	1,505
“ Jagst.....	280,053	122,987	655	3,911
“ Danube.....	170,267	294,522	396	2,627
Total.....	1,361,559	590,178	5,888	13,331

In 1896 there were in the whole kingdom: Prot. evangelicals 1,441,240, Rom. Cath. 620,474, other Christians about 7,500, Jews 11,887, other religions about 200; in 1900 1,497,299 were Prot. evangelicals, 650,311 Roman Catholics; 9,426 other churches, and 447 other religions. Of the whole pop. (1900) 69 per cent. were Protestants.

Several dialects of German are spoken, of which the Swabian and Franconian are the most general. W. has been the native country of many distinguished men, of whom a few are: in poetry—Schiller, Uhland, Wieland, Kerner: in theology and philosophy—Brentz, Ecolampadius, Bengel, Schelling, Hegel, Baur, Strauss, etc.: in science and art—Kepler, Stiefel, Tobias Mayer, the botanists Joseph and Karl Friedrich Gärtner, the chemist Schönbein, the painters Eberhard Wächter, Hetch, and the famed sculptor Dannecker.

Every child between 6 and 14 years must attend school. In a district having 30 or more families is a public school, and a teacher for every 90 children. There are four Prot. theol. seminaries, with a course of four years; gymnasia, grammar, trades, and high schools in all the principal towns. The univ. at Tübingen has 80 ordinary and extraordinary professors and tutors. The number of students averages about 1,000, of whom 200 to 300 are foreigners. At Hohenheim is an agricultural and botanical institution, in which farming, management of forests, and gardening are scientifically taught. Stuttgart has a polytechnic school, one of the best institutions of the kind in Germany. It is stated that there is not in W. a person above ten years of age who cannot both read and write.

*Revenue, Expenditure, etc.*—In 1896-97 the estimated revenue was 70,900,447 marks (\$17,725,112), expenditure 71,744,325 marks (\$17,936,081), debt 468,051,000 marks (\$117,013,000).

*Government, etc.*—The crown is hereditary in the male line, and failing that, in the female. Freedom of the press and religion are maintained. The privy council consists of a pres., the six ministers of state, and members named by the king. The legislative body is composed of two chambers—the first formed of princes of the royal family, nobles, and members appointed by the king, the class last named not exceeding a third part of the whole; the second



## WÜRTENBERG.

chamber is composed of 13 representatives of the knight-hood, 6 Prot. gen. superintendents, the bp. and two others of the Rom. Cath. clergy, the chancellor of the univ., 7 representatives from the cities Stuttgart, Tübingen, Ludwigsburg, Ellwangen, Ulm, Heilbronn, and Reutlingen, with a representative from each of the 64 bailiwicks. Members of the second chamber are not eligible as such before their 30th year. The king has the power of proroguing or dissolving the chambers; but in the latter case a new election must take place within six months. As a member of the reconstituted German empire (1871), W. has 4 votes in the federal council, and 17 representatives in the diet of the empire.

*History.*—The earliest inhabitants of W. were probably Celts; but when the Romans came first to know the country, it was held by the Suevi, who were succeeded by the Alemanni and the Franks. In 1090 Conrad, Count of Württemberg, possessed a castle near Cannstatt, with limited territories, which were largely increased by Ulric I. 1246–65. Other extensions were gained by Eberhard I. 1279–1325; by Ulric II., who, though a man of peace, added Tübingen; Eberhard II., who secured Teck, Gutenberg, Kirchheim, Herrenberg, and other places. By the marriage of Eberhard IV. with the Countess of Montbéliard, that county became connected with Württemberg. At his death, the possessions were divided between his two sons, each of whom enlarged his portion; and a few years after their death, Eberhard V. secured a reunion, and the land advanced rapidly in power and importance. In 1495 Emperor Maximilian raised Eberhard to the rank of duke, with the title Eberhard I. In 1519, Duke Ulrich having offended the Swabian League by some arbitrary acts of oppression on the imperial free city of Reutlingen, he was forcibly ejected from W., and did not reconquer his estates till 1534. While Eberhard III. was duke (1628–74), W. suffered much in consequence of the 'Thirty Years' War. Ludwig Eugene (1793–95) having taken part in the war against the French republic, a French army attacked and compelled him to resign Montbéliard and pay 8,000,000 francs.

With Duke Frederick II., who succeeded his father 1797, the most important period in the history of W. begins. In 1800, compelled by the French to flee from his dukedom, he got back, by the peace of Lunéville, all his territories except Montbéliard, and instead had others granted, with the rank of elector. Having aided Napoleon in the war against Austria, at the peace of Presburg (1805) W. was further enlarged and made a kingdom. After the battle of Leipzig, Frederick abandoned the cause of Napoleon, and concluded a treaty with Austria, in which his lands were guaranteed. His reign was arbitrary; and internal troubles were thickening around him, when he died 1816, and was succeeded by his son, William I. (1781–1864), who was born at Lubin, in Silesia, 1781, Sep. 27. He was cordially welcomed to the throne, and the expectations of his subjects were realized. His first acts

## WURTZ.

were to reduce the expenditure, and introduce other reforms, prominent among which was the liberal constitution of 1819. In 1848-50 there was strong agitation with the view of obtaining some permanent modifications in this constitution, but without success. For nearly 50 years he reigned over a people steadily increasing in prosperity. His son, Charles Frederick Alexander, known as Charles I., b. 1823, succeeded him. On his death, 1891, Oct. 6, he was succeeded by his cousin, Wilhelm II., b. 1848, Feb. 25. See GERMANY.

WURTZ, *vürts*, CHARLES ADOLPHE: French chemist: b. Strasbourg, 1817, Nov. 26. He was educated at the Prot. gymnasium in that city, graduating B.L. 1834; studied medicine, and graduated M.D. 1843; pursued chemistry under Liebig, and 1844 under Dumas at Paris. Since 1847 he has occupied successively a number of chairs in the principal institutions of Paris, for many years holding that of chemistry in the School of Medicine, also in the Sorbonne. He has received many honors, prizes, and medals, and was made permanent senator 1881. Among his most remarkable discoveries were the hydride of copper, the compound ammonias, and evidence that free hydrogen is a compound with itself. His investigations and papers have been very numerous, and after 1858 were published mostly in *Répertoire de chimie pure*, which he edits. Among his works are: *Traité élémentaire de chimie médicale* (3 vols. 1864-5); *Leçons élémentaires de chimie moderne* (1866-68); *Dictionnaire de chimie pure et appliquée* (1868); *Les hautes études pratiques les universités allemandes* (1870). Portions of these have been translated under the titles *Chemical Philosophy according to Modern Theories*, and *Theory from the Age of Lavoisier*. His latest books are *Théorie Atomique* (1879), and *Traité de chimie biologique* (1885).

WURTZ, *vürts*, HENRY, PH.D.: chemist: b. Easton, Penn., 1828, June 5. He graduated at Princeton 1848; studied chemistry at the Lawrence Scientific School at Harvard; was assistant in chemistry at Yale; state chemist of N. J., and on its geological survey; prof. of chemistry in Queen's Coll., Canada, 1857, and in the National Medical Coll., Washington, D. C., and patent-office examiner 1858-61. Removing to New York, he edited the *Amer. Gas-light Journal*; and continued his researches, which are many and important, including original methods of producing alum and potassium salts from greensand, fuel-gas from cheap coal, magnesia from sea-water, liquid and other products from coal; and other economic processes. Since 1888 he has been employed as chemist by Thomas A. Edison. His scientific papers and reports are numerous.



## WÜRZBURG.

WÜRZBURG, *vürts'bûrch*: city, cap. of the former principality of Würzburg, now of the Bavarian circle of Lower Franconia; in a beautiful valley on both sides of the Main, over which is a stone bridge 600 ft. long, of eight arches. Among the public buildings, the most distinguished are the episcopal palace or residence, rebuilt 1730-44, one of the most magnificent royal residences in the world; and the spacious and excellently equipped Julius Hospital, established 1576. Of the many churches, the most notable are the richly decorated cathedral, rebuilt in the 11th and following centuries; the Marienkapelle, one of the most beautiful monuments of old German art, with 14 statues of the 15th c. by Tilmann Riemenschneider; and the Neumünster Church, containing the bones of St. Kilian. The streets adjoining the Palace Square are wide and straight, but most of the others are narrow and crooked. In front of the Julius Hospital is a bronze statue of the founder, Bp. Julius, by Wiedemann, founded in bronze by Miller: a monument of Walther von der Vogelweide (q.v.) stands in a niche outside the Neumünster Kirche.

The University of W. was founded 1582 by Bp. Julius, who founded also the hospital. The endowments for both institutions were taken from the possessions of the convents destroyed during the Peasant War (q.v.). To promote the study of medicine, the hospital was put in connection with the univ., the professors of medicine being made physicians and surgeons to the hospital: this connection has kept the medical faculty in high reputation, and promoted the prosperity of the univ. The medical staff includes several names of European reputation. All the professors of the theological faculty are thoroughgoing advocates of the dogma of papal infallibility. There is also a faculty of political economy. In 1903 there were about 96 professors and teachers, and 1,198 students (462 medical). The library has 200,000 vols. In the Musical Institute, any one can receive instruction gratis in singing or in playing any instrument; and twice a week great musical pieces are performed. Besides the univ., there is a gymnasium, a Latin school, a district agricultural and trade school, a seminary for Rom. Cath. priests and a seminary for training teachers, an orthopedic institution, a veterinary school, a school for midwifery, a swimming school, a soc. for improvement of the arts and manufactures, and a female soc. for encouragement of skill in arts and handicrafts among women. Besides the Julius Hospital, there are asylums for the deaf and dumb and for the blind, and other charitable institutions. The manufactures are woolen stuffs and cloth, mirror-glass, leather, tobacco, railway carriages, and sparkling wines. The fortress of Marienberg, on the site where Drusus founded a castle, is on a hill 400 ft. high, on the left bank of the Main, outside the town. The campaign of the Prussian army of the Main ended with a battle before W., 1866, July 27. The fortifications have been demolished.—Pop. (1880) 51,014; (1885) 55,100; (1890) 60,844; (1900) 75,499.

## WÜRZBURG—WYANDOTS.

WÜRZBURG, or WIRZ'BERG: former sovereign bishopric or ecclesiastical principality of the German empire, in n.w. Bavaria; now chiefly included in the circle of Lower Franconia; founded 741 (according to other accounts, 742 or 746); area 1,827 sq. m., pop. 250,000; yearly revenue 500,000 guildens. It received endowments from the Frankish kings, which were increased by the German emperors. The first bishop was Burkhardt, consecrated by Boniface. The patron saint was Kilian (q.v.), said to have preached the gospel here as early as 688. By good management and economy, the bishops were able to acquire numerous possessions of the neighboring Frankish proprietors; and out of these was gradually formed the extensive sovereign bishopric of W., ruled over by the prince-bishop as Duke of Franconia. The ducal title and authority were conceded first about 1120. In spiritual matters the bishops were under the abp. of Mainz. At the peace of Lunéville (1801), the bishopric of W., like the other spiritual principalities of Germany, was secularized; and 1803 the greater part of it was conferred on the Elector of Bavaria as a secular principality. The last prince-bishop received a pension, and died at Bamberg 1808. At the peace of Presburg (1805), Bavaria gave up W. to the Grand Duke Ferdinand of Tuscany, and the principality was raised to the dignity of an electorate. In 1806 Elector Ferdinand joined the Confederation of the Rhine, and from that time took the title Grand Duke of Würzburg. By a decree of the Vienna Congress, the grand duke received his hereditary state of Tuscany, and W. reverted to Bavaria.

WURZEN, *vûr'tsên*: small walled town of Saxony, 15½ m. e. of Leipzig, picturesquely situated amid romantic valleys; on the Mulde, here crossed by two bridges. The people are employed in brewing, bleaching, weaving, and hosiery-work.—Pop. 9,719.

WŪ-SŪNG, or Woo-sŭng, *wó-sông'*: town of China, at the mouth of the river Wŭ-sung (the river by which Shanghai is approached); about 13 m. below that city. Just above W. is a bar which is gradually silting up, and forms a serious obstacle to the movements of the large steamers engaged in the foreign trade with Shanghai. Efforts have been made, but without avail, to induce the Chinese govt. to remove this bar—the Chinese regarding it as a 'heaven-sent' barrier for defense of the city.

WYANDOTS, *wî-an-dôts'*: tribe of N. Amer. Indians, of the Iroquois family, the Hurons of the French writers, who called themselves Wendats or Yendats; known first at Montreal, where, in the middle of the 17th c., they became Rom. Catholics under the instructions of the French missionaries. Having, as allies of other tribes, become involved in a war with the Iroquois, they were nearly exterminated, and the remnant emigrated to the country around Lake Superior; afterward gathered at Mackinaw 1670 under the care of Father Marquette; thence came to Detroit, where they furnished 400 warriors to the English



## WYANDOTTE—WYANT.

1812. In 1829 they were settled, to the number of 600, on the head-waters of the Sandusky river in Ohio; and 1832, by a treaty with the U. S. govt., removed to Kansas, where the few remaining have acquired the rights of citizenship, each having a farm of 40 acres.

WYANDOTTE, *wī-an-dōt'*: formerly a town in Kan.; pop. (1886) 13,840: consolidated 1886 with two other towns (pop. 7,389), under the name KANSAS CITY, Kansas (q.v.).

WYANDOTTE, *wī-an-dōt'*: city in Wayne co., Mich.; on the Detroit river, and on the Lake Shore and Michigan Southern and the Michigan Central railroads; 12 m. s.s.w. of Detroit. It contains high school, union schools, 6 churches, 1 savings bank, and 1 weekly newspaper; and besides manufactures of iron ships, agricultural implements, iron-rails, and stoves, has several rolling-mills, blast furnaces, saw and planing mills, and silver-smelting and refining works.—Pop. (1890) 3,817; (1900) 5,183.

WYANDOTTE' CAVE: natural cavern in Jennings tp., Crawford co., Ind.; 5 m. from Leavenworth, a town on the Ohio river, and about 30 m. s.w. of New Albany. It is next to Mammoth Cave in size and interest, and even excels it in the beauty and dimensions of some of its chambers; but, unlike that cave, has no rivers or lakes. It has been explored a distance of 22 m., including the side-galleries, and its greatest width is 300 ft., greatest height 245 ft. The two largest chambers are Mammoth Hall and the Senate Chamber. Mammoth hall is 350 ft. long and 245 ft. high. In it is Monument Mountain, 175 ft. high, on whose top are three large stalagmites, one called Lot's Wife. Wallace's Dome rises 70 ft. above the top of the mountain, or 245 ft. from the floor of the cave. In the Senate Chamber is the Pillar of the Constitution, about 25 ft. in diameter and 30 ft. high, and extending from the summit of a stalagmite hill to the ceiling. Beauty's Bower, Island of Confusion, and Purgatory, Pillared Palace, and White Cloud Room are other points of interest. It has a variety of cave fauna; and Epsom salts, alum, and nitre have been obtained in it.

WYANT, *wī'ant*, ALEXANDER H.: landscape artist: b. Port Washington, O., 1836, Jan. 11. He studied his art in Germany and England, and after his return became associate of the National Acad. 1868, and academician 1869. His subjects include a great variety of characteristic phases of American scenery, such as sea-coast and salt-marsh, river, lake, prairie, and Adirondack views and effects, at all hours and seasons; and his work is such as to place him, in the opinion of some leading artists, at the head of our landscape painters, by the side of Innes and one or two others. His pictures have all good qualities in combination, with an especial delicacy of feeling and treatment. *An October Day*, National Acad. 1892, is a fine example of his work. His right arm became disabled, but with his left hand he even excelled himself. Died 1892, Nov. 29.

WYAT, *wi'at*, Sir THOMAS: 1503-1542; b. at Allington Castle, Kent, England; son of Sir Henry W., who stood high in favor with Henry VII. and Henry VIII. In 1515 W. was entered at St. John's College, Cambridge, where he took his degrees bachelor and master of arts. While very young, he was married to Elizabeth Brook, daughter of Lord Cobham. Through his father's influence, a career at court was open to him. In this sphere he was thoroughly well qualified to succeed; he was one of the most accomplished men of his day; of noble presence and fine manners, and withal dexterous and subtle in the management of affairs, though of unimpeached honor and integrity. In 1536 he received knighthood, and 1537 he was made high sheriff of Kent. Though necessarily involved in much perilous court-intrigue, he continued to retain the favor of the king, though once or twice in some hazard of losing it; and was frequently employed by him in positions of trust and importance. His chief service was as English ambassador at the court of Charles V. In 1542, in token of the king's appreciation of his services, he received a grant of lands at Lambeth; and the year after he was named high steward of the king's manor at Maidstone.

Among the accomplishments of W. was verse-making, which he seems to have cultivated early, and continued through life. He acquired considerable reputation as a poet; and in 1557 his poems, with those of the more brilliant Surrey, were published in London. Though not in themselves of very high rank, W.'s poems are important, and hold a permanent place as marking a stage in the progress of English literature. His love-poetry is somewhat overrun with conceits derived from the study of Italian models; but some shorter pieces are models of grace and elegance. His satires also possess merit. W. was the first writer of English sonnets, and of English satires in the classical form. His works were published in London (2 vols. 1815).

WY'AT, Sir THOMAS, 'the Younger': about 1520-1554, Apr. 11; only son of Sir Thomas W. (1503-42). After a wild and riotous youth, he raised a body of men at his own expense, and did good service at the siege of Landrecies (1544), showing military capacity; and continued in honorable service on the continent till 1550. In 1554, when the Spanish match for Queen Mary was in agitation, W. joined the insurrection, and led the Kentish men to Southwark, after gaining considerable successes over the royalists; but, failing to capture Ludgate, he became separated from the main body of his followers, and was taken prisoner, and soon afterward put to death.



## WYATT—WYCHERLEY.

WYATT, Sir MATHEW DIGBY: English architect and writer on art: 1820–1877, May; b. Rowde, near Devizes, Wilts. After apprenticeship and studying at the Royal Acad., he went to the continent and made diligent study of the architecture of Italy, France, and Germany. He returned to England 1846, and 1848 published *Geometrical Mosaics of the Middle Ages*. He had an important part in the arrangements of the 1851 exhibition, and of the Sydenham Crystal Palace. In 1856 he was appointed architect to the E. India Company. In 1865 he was made honorary member of several foreign academies, and 1866 received the royal gold medal of the Royal Institute of Brit. Architects. He was knighted 1869, and in the same year was chosen Slade prof. of fine arts at Cambridge. His chief art publications are *Metal Work and its Artistic Design* (1852); *Industrial Arts of the Nineteenth Century* (1853); *Art Treasures of the United Kingdom* (1857); *Fine Art* (1870); *Architects' Handbook in Spain* (1872).

WYATT, RICHARD JOHN: English sculptor: 1795, May 3—1850, May 29; b. in Oxford street, London; of a collateral branch of the family which made the name of W. famous during two centuries in connection with architecture and sculpture, descendants from yeoman stock in Staffordshire. He became an articled pupil of Charles Rossi, R.A., sculptor; and afterward a student of the Royal Acad., whose medal was twice awarded to him during his pupilage. He afterward studied in Paris under Bosio; and 1821 went to Rome, and in the studio of Canova, had Gibson for a fellow-pupil, and in that city he lived thereafter. Living only for his art, he labored at it incessantly—often, it is said, from dawn till after midnight; and the number of his works is very great. Elegance and refinement, with animation and finish, are his characteristic merits, but his works show also a graceful invention. His favorite subjects were classical and poetical.

WYCH-ELM, n. *wich'ělm* [from same root as WITCH-HAZEL]: a variety of the elm, *Ulmus montāna*.

WYCHERLEY, *wich'ér-lī*, WILLIAM: comic English dramatist of the period of the Restoration: about 1640–1715, Dec.; b. at Clive, near Shrewsbury. His father, a cavalier squire of £600 a year, sent his son to France at the age of 15; and during his residence on the banks of the Charente, the youth was a favorite at the court of the gov. of Angoulême, whose accomplished wife, the Madame Rambouillet of Voiture, converted him to the creed of the Church of Rome. On his return to England 1660, W. studied a short time at Oxford, where he was reconciled to the Anglican Church; and he was then entered of the Middle Temple. Neither at Oxford nor at the Middle Temple did W. distinguish himself as a student. He was above all things a fine gentleman, and a man of society. He naturally gravitated to the literature of the stage. His first comedy, *Love in a Wood*, was acted with great applause, and published 1672, and it was

followed by three other successful comedies—*The Gentleman Dancing-master* (1673); *The Country Wife* (1675); and *The Plain Dealer* (his best work) (1677). About 1680, the dramatist was married to a young and rich widow, the Countess of Drogheda, whom he had met at Tunbridge. The lady was distractedly jealous of him, kept him from frequenting the court, which lost him the favor of the king, and watched him closely wherever he went. Indeed, his marriage, kept secret at first, when it had come to the king's knowledge caused the king to change his plan of committing to W. the education of his son, the Prince of Wales. The countess did not live long, and she left him the whole of her fortune; but his succession to the estate was disputed, and an expensive lawsuit ensued, the costs of which, added to personal debts, fairly broke down the unlucky dramatist. He was committed to the Fleet, and languished there neglected for seven years. He was partly relieved by the bounty of James II.—probably because he returned to the communion of the Church of Rome—and he succeeded to the patrimonial estate in Shropshire by the death of his father. This did not, however, much relieve him, as the estate was heavily mortgaged and strictly entailed. He was on bad terms with the heir-at-law, his nephew; and, it is said, on purpose to injure this relative, W., at the age of 75, married a young girl, on whom he settled a jointure; and 11 days after this transaction—perhaps the most scandalous act of his life, as Macaulay describes it—the old dramatist died. It is, however, entirely possible to assign other motives for this marriage than that which roused Macaulay's animadversion. W. was interred in St. Paul's Church, Covent Garden. Besides his comedies, he published a volume of wretched *Miscellany Poems* 1704; and another volume, partly of 'moral reflections,' was pub. after his death. The comedies of W., on which his fame rests, reflect the literary taste, the manners, and vices of the times in which he lived: thus they are, in truth, grossly immoral and profligate. They have, however, some literary excellence. The language is clear and forcible, the dialogues are often witty and lively, some of the characters vigorously drawn; and the observations and maxims scattered throughout the different scenes are shrewd and sensible, and expressed in a terse, sententious style. W. is regarded as the creator of brilliant dramatic repartee. He was the founder of that school of artificial comedy which Congreve, Farquhar, and Sheridan carried to its highest perfection, imparting to it an airy grace and brilliancy far above the reach of its first master.



## WYCLIFFE.

WYCLIFFE (or WYCLIF, or WICLIF, or WICLIFFE, or WICKLIFFE), *wik'lif*, JOHN DE: greatest of all the 'Reformers before the Reformation:' about 1320-1384, Dec. 31; b. conjecturally in the parish of Wycliffe-on-Tees, near the town of Richmond in Yorkshire, England. [His name is spelled in 28 different ways.] He studied at Oxford; but of his early university career nothing is known.

W. emerges into public notice 1361, when his name appears as master of Balliol Hall—as Balliol College was then called. In May of that year he was instituted to the rectory of Fylingham, in Lincolnshire, and shortly afterward resigned his mastership and went to reside at his rectory. About 1363 he took his degree, and began to read lectures on divinity at Oxford, in which his anti-Roman views were first expounded. In 1368 he exchanged the rectory of Fylingham for the living of Ludgershall, in Bucks; and in 1374 was presented to the parish of Lutterworth, of which he remained priest till his death.

In the great struggle maintained by Edward III. and his parliament against the claims of the papacy regarding the exaction of certain tribute-money granted by King John in acknowledgment of the fealty of the kingdom to the Roman see, W., who had been advanced to be one of the king's chaplains, was called to reply to a defense of the papal claim, which had been anonymously sent abroad. This he did publicly at Oxford in an ingenious and powerful manner, and thus early showed his antipathy to the political pretensions of Rome. A clear evidence of his growing reputation is furnished by his appointment, 1374, as second in a commission sent to Bruges to confer with the papal legate as to certain abuses on the part of the papacy complained of by the English parliament. It was probably on his return from this mission that W. was promoted to a prebend in the diocese of Worcester, and at the same time presented to the rectory of Lutterworth, in Leicestershire. Here he labored with great zeal, preaching on Sundays and on the several festivals of the church, and showing himself 'a most exemplary and unwearied pastor.' Here also he began openly to speak his mind as to the papacy. The insight into papal doings which he had received at Bruges seems to have confirmed suspicions previously forming in his mind, and he is said, soon after his return to England, to have styled the pope 'Antichrist,' 'the proud worldly Priest of Rome, the most cursed of Clippers and Purse-kervers' (cut-purses). Then began in earnest his troubles with the hierarchy. Early in 1378 he was summoned to a meeting of Convocation, to be examined for his opinions. He obeyed the summons, but he appeared attended by his friend John of Gaunt and others. A great tumult ensued, the London citizens bursting into the chapel, and frightening the synod of clergy, who were ordered to sist proceedings. The papal authority was then invoked against W., and Gregory VI. issued several bulls—three to the abp. of Canterbury and other bishops, one to the king, and one to the Univ. of Oxford—commanding an inquest into W.'s erroneous doctrines. W. was accordingly again summoned

before the prelates at Lambeth; but on this occasion he escaped with an injunction to refrain from preaching the obnoxious doctrines.

This served only to make W. a more thorough Reformer. He now entered on his great work of translating the Scriptures, or rather, for the most part, of revising existing translations, and circulating them among the common people. He had a great retinue of 'poor preachers,' as his itinerants were termed, whom he sent in all directions to preach among the common people. He also challenged the dogma of transubstantiation; though he always believed in some kind of real presence. Many of the people, the burghers and the middle class, heard him gladly, and affairs seemed tending to an open rupture with the papacy. But the times were not ripe for this. Many who otherwise sympathized with the Reformer were afraid of his views about transubstantiation. He was summoned to answer especially on this head, first before a synod at the Greyfriars, London, finally before Convocation 1382. He appeared, and defended himself with great subtlety and power. His defense was unavailing. Twenty-four 'erroneous' statements were picked out of his works, which were in consequence condemned and ordered to be burned. He was banished from Oxford, but was allowed to retire to his parish of Lutterworth. His health was already shattered by hard work and many anxieties, and on the last Sunday of the year 1384 he was stricken by paralysis while conducting public worship, and three days afterward expired.—W. appears to have been a man of simple faith and of earnest and manly courage. He made a strong impression on his age—an impression which seems to have been not entirely effaced even to the time of the Reformation. The Lollards, as his disciples were called, were not only among the poor, but also in the church, the castle, and even on the throne. Political mischances, however, overtook the party in the following century, and only a few traces of it survived here and there when the movement of the 16th c. began. In Bohemia John Huss was W.'s disciple; and from Huss's works, largely extracts from W.'s writings, Luther drew much of his reformatory spirit and equipment: see HUSS, JOHN.

The pre-eminence of W. is due to the influence of the Bible on him, as well as to the fact that he first gave the volume entire to the world in English translation. From it he had already drawn his evangelical doctrines, his profound experience of Christian truth, his fearless protest against the errors of the dominant church, his persistent intrepidity in opposing these; and none the less his exaltation of character, his scriptural and spiritual preaching, and his zeal to bring the people to the knowledge of the saving truth, prompting him to send forth humble preachers, many of them laymen, into the highways and byways—thus anticipating Wesley by three centuries and a half. It was as the greatest instrument in this practical work that his translation of the sacred volume was undertaken; and it was his burning zeal to enlighten and save the people



that shaped this translation into the pure English, simple yet noble, which has made our common version, largely founded on his, the enduring standard of our Anglo-Saxon tongue. Trained in all the learning of his university, and accustomed to controversies with the learned that involved all the subtleties of the schools, W. could instantly resort to the vernacular, and put himself in full sympathy with the common folk, in his preaching, pamphleteering, and translating. It has been well said that his translation 'marks an epoch in the development of the English language, almost as much as Luther's translation does in the history of the German tongue. The Luther Bible opens the period of the new High German; W.'s Bible stands at the head of the Middle English.' John R. Green, in his *Short History of the English People*, says: 'If Chaucer is the father of our later English poetry, Wycliffe is the father of our later English prose.' But the literary marvel is the least of all, in Wycliffe's far-reaching work. In the words of Dr. R. S. Storrs's oration at the Wycliffe semi-millennial celebration by the American Bible Soc., 1880: 'How vast the impression produced by the version which thus burst into use, not on language only, but on life, in the whole sphere of moral, social, spiritual, even political experience, who shall declare!'

T. Arnold published 3 vols. of W.'s select works 1871; and F. D. Matthew his hitherto unprinted *English Works* 1881. The *Trialogus* was edited by Lechler 1869: see Lechler's *Johann von W.* (1873), transl. (1878) by Prof. Lorimer; and *Wyclif's Place in History*, by Montagu Burrows (1882).

WYCOMBE, *wik'om* or *wi'kom*, or HIGH WYCOMBE, or CHIPPING WYCOMBE: municipal and parliamentary borough in Bucks, England; surrounded by beech-clad hills; 29 m. w.n.w. of London; on the Wye, small affluent of the Thames. The Church of All Saints is a large and handsome building, erected 1273; it is in Norman and Early English architecture, and consists of a nave and two aisles, and with the chancel is 180 ft. long. The tower, built 1522, is 96 ft. high. There are corn and paper mills on the Wye; and beech-wood and other chairs are made here on a large scale—the chairs annually averaging in number more than 1½ millions. The village of West Wycombe is near.—Pop. (1871) municipal borough 4,811; (1881) 10,618; (1881) 13,154; (1891) 13,435.

WYE (written also Y), n. *wī*: the letter Y or something resembling it; a crotch, used in many ways as a temporary shore or brace. Also, a stem or pipe with branches, as a stand-pipe or delivery-pipe with two issues from its summit: one of the supports of a telescope, theodolite, or leveling instrument.

## WYE—WYKEHAM.

WYE, *wī*: river of England, of picturesque beauty and considerable importance, an affluent of the Severn; rising in two copious springs on the s.e. side of Plinlimmon, less than 2 m. from the head-water of the Severn (q.v.). It flows s.e. through Montgomeryshire and Radnorshire, forming the s.w. and s. boundary of the latter, e.s.e. to the middle of Herefordshire, and then s., dividing in its lower course the county of Monmouth from that of Gloucester, and entering the estuary of the Severn below Chepstow. Length 130 m., for 70 m. of which, to Hereford, it is navigable for barges, though large vessels cannot ascend above Chepstow Bridge. At Chepstow (q.v.) the tide rises higher than at almost any other place in Great Britain. The part of the river which separates Monmouth from Gloucester is that chiefly visited for its singular beauty.

WYKEHAM, *wīk'am*, WILLIAM DE: English architect, prelate, and chancellor: 1324-1404, Sep. 27; b. Wickham, in Hampshire. He was educated at Winchester. In 1347 the bp. of Winchester introduced him to the king as a young man whom he might find useful in architecture, etc. For some years, though he had received the tonsure, his employment was mostly secular, as surveyor and clerk of works, and warden of castles. In 1362 he was ordained deacon and priest; 1363 archdeacon of Northampton and prebendary of Wells. In 1364 he was appointed keeper of the privy seal. He was in high favor with the king, and one of the most eminent men of the kingdom. In 1366, by the king's recommendation, he was elected bp. of Winchester, and was consecrated 1367, Oct. 10. Meanwhile he had been appointed lord high chancellor of England. He resigned 1371, on a petition being presented to the king against the government remaining too long in the hands of men connected with the church. He now devoted himself to various objects of lasting usefulness. His preparatory college or school at Winchester was opened for teaching 1373; but the building was not begun till 1387: it was finished 1393: see WINCHESTER COLLEGE. In the college which he instituted also at Oxford, teaching had begun 1373; but the building of 'St. Mary's College of Winchester in Oxford,' usually called New College (q.v.), was not begun till 1380: it was finished 1393. He began the rebuilding of Winchester Cathedral 1395, and just lived to see it finished. Meanwhile he had become the object of resentment to the Duke of Lancaster and party, at whose instance he was indicted for pecuniary defalcation and other crimes alleged to have been committed by him as keeper of the privy seal and lord chancellor. He was heard 1376 before a commission of peers, bishops, and privy councillors, declared guilty, and a severe sentence was passed on him. It was, however, ultimately commuted into a fine, which was remitted on the accession of Richard II. 1377. He was one of the council of 14 appointed to the king 1386, and 1389 he was again made lord chancellor. He continued in office till 1391, when he resigned; and thenceforth appears to have taken little active part in public affairs. He was present in the parliament 1399,



## WYLIE—WYLLYS.

Sep. 30, when Richard II. was deposed. He was also present in the first parliament of Henry IV. He died at South Waltham.—See *Life* by Dr. (afterward Bp.) Lowth (Lond. 1754).—W. of Wykeham was one of the most munificent benefactors of the English Church. He loved learning, order, civilization, and purity of manners, and as bp. of Winchester signalized himself by his rigorous reformation of ecclesiastical abuses; but he had not the slightest tendency toward *Protestantism* in doctrine, affording in this respect a striking contrast to his great contemporary Wycliffe (q.v.). W. of Wykeham may be taken as the type of a class of English Churchmen both before and after the Reformation—men destitute of zeal on questions of doctrine, but zealous for the dignity, culture, and practical efficiency of the church.

WYLIE, *wī'li*, ROBERT: artist: 1839–1877, Feb. 4; b. in the Isle of Man. His family emigrating to this country when he was a child, he was educated here, studying art in the Pennsylvania Acad. At 24 years of age he went to Paris, where he gained a medal at the Salon; and, continuing to reside there, he was little known here except through a few meritorious paintings, such as the *Death of a Vendean Chief*, painted in 1876, and now in the Metropolitan Museum, New York.

WYLLYS, GEORGE: Puritan colonist, and gov. of Conn.: 1570–1645, Mar. 9; b. Fenny Compton, Warwickshire, England. An ardent Puritan, with a univ. education and a large estate, he sent his steward, William Gibbons, and 20 workmen, to Hartford, Conn., 1636, to buy him an estate and build a mansion. He came with his family 1638; was one of the framers of the constitution 1639, and chosen one of the first magistrates; was dep. gov. 1641, gov. 1649. W. was held in high esteem for excellence of character. In manners he was simple. He was a great advocate of liberty in state and church.—His son, SAMUEL W. (b. 1632, Warwick, England; d. 1709), graduated at Harvard 1653, was elected a magistrate 1654, and held office under the charter more than 30 years. It was in a phenomenally ancient oak on his estate that the charter was hidden (see CHARTER OAK).

WYLLYS, SAMUEL: revolutionary soldier: 1739, Jan. 15—1823, June 9; b. Hartford, Conn.; son of George W. (1710–96), who was grandson of the colonist George W., and who graduated at Yale 1729, was town-clerk of Hartford 1730–96, and sec. of the colony 1734–96. W. graduated at Yale 1758; was appointed lieut.col. of Spencer's regt. 1775; commanded a regt. at the siege of Boston; became a col. in the Conn. line 1776; and served to the close of the war. On his return to Hartford, he was prominent in civil office, and at his father's death became sec. of the colony 1796–1809. When he resigned on account of failing health, there lacked but two years of a century during which his grandfather, Hezekiah W., colony sec. 1712–30, his father, and himself had continuously served as sec. of Conn. colony and state.

## WYMAN.

WYMAN, *wi'man*, JEFFRIES, M.D.: comparative anatomist: 1814, Aug. 11—1874, Sep. 4; b. Chelmsford, Mass. He graduated at Harvard 1833, and from its medical school 1837; was demonstrator of anatomy in that school, and curator of the Lowell Institute, Boston, where he gave a course of lectures on comparative anatomy 1840; spent three years in Paris and London in his studies; and was prof. of anatomy and physiology in Hampden-Sidney Coll., Va., 1843-47. He succeeded Dr. John C. Warren as Hersey prof. of anatomy at Harvard 1847, which position he retained until his death in Bethlehem, N. H. In 1849 he gave a course of Lowell lectures on comparative physiology, which, as published in pamphlet form from full reports in a Boston paper, had extensive circulation. He travelled in S. America 1856, and again, crossing the continent, 1858-9, enriching science and at the same time his pioneer museum of comparative anatomy, which was subsequently added to the collections of the Boston Soc. of Natural History. His principal publications were of new researches in their day: such as *The Osteology of Troglodytes gorilla* (1847); *The Anatomy of the Nervous System of Rana Pipiens* (Smithsonian Contributions 1853); *Observations on the Development of the Skate* (1864); *On the Skeleton of a Hottentot* (1865); observations in 1867 opposed to spontaneous generation; etc. In the biog. memoirs of the National Acad., 175 titles of his books and papers are given. His courses of lectures were popular with scientific students at Harvard. In his later years he gave much attention to archeology, discovering and investigating prehistoric shell-heaps, both north and south; and he left a work, published 1875, *Fresh-water Shell-mounds of St. John's River, Florida*.

WYMAN, MORRILL, M.D., LL.D.: physician: b. 1812, July 25, at Chelmsford, Mass. He graduated at Harvard, A.B. 1833, M.D. 1837, and settled in Cambridge as a practicing physician—serving also 1853-56 as adjunct prof. of the theory and practice of med. at Harvard. He invented 1850 an instrument, consisting of a trocar and cannula of very small diameter fitted to an exhausting syringe, with which the operation of penetrating to cavities in the body, to draw off fluid, is made comparatively safe and painless, instead of dangerous and often fatal, as formerly. Dr. W. has published *A Practical Treatise on Ventilation* (1846); *Progress in School Discipline* (1868); *Autumnal Catarrh* (1872); *Memoir of Daniel Treadwell* (1888).

WYMAN, ROBERT HARRIS: naval officer: 1822, July 12—1882, Dec. 2; b. Portsmouth, N. H. He entered midshipman 1837, Mar. 11; at Naval School, Philadelphia, 1842-3; passed midshipman 1843, June 29; served as acting master of a frigate 1843-46; was in the Gulf squadron in the Mexican war, and took part in the siege and capture of Vera Cruz; served at Washington at the Naval Observatory 1848-50, and again 1853-4. In the civil war, after other service, he commanded the Potomac flotilla; was promoted commander 1862, July 16; was on blockade service 1863-4; was commissioned capt. 1866, July 25; served



as chief hydrographer 1869-77; was made commodore 1872, July 19; rear-admiral 1878, Apr. 26; commander-in-chief of n. Atlantic fleet 1879-82; and chairman of the light-house board 1882, June 5. He died suddenly in Washington.

WYND, n. *wind* [AS. *windan*, to bend, to twist]: in *Scot.*, a lane or alley in a town.

WYN'KOOP, HENRY: 1737, Mar. 2—1812, Oct. 24; b. Northampton co., Penn.; descendant of Gerardus W., settler in Moreland, Penn., 1717. W. acted on a patriot county committee 1774; was a deputy to the provincial conference 1774, July 15, and to that at Carpenter's Hall, Philadelphia, 1775, June 18; took military service as maj. of a battalion; served on the general committee of safety 1776, July—1777, July; succeeded Edward Biddle as member of cong. 1779, Mar. 3; was re-elected 1780, Nov. 24, and again 1781, Nov. 22; was a justice of the court of common pleas 1780-89; and was a member of the first U. S. cong. 1789-91. He served 1791-1812 as associate judge of Bucks co., Penn.

WYNN, *win*, RICHARD: revolutionary soldier: 1750-1813; b. in e. Va. He became a continental soldier early in the revolution; was lieut. of rangers in S. C. 1775, and took part in the battle of Sullivan's Island; had command at Fort McIntosh, Ga.; was made col. and put in charge of the militia in Fairfield dist., S. C.; fought in the Hanging Rock engagement, and was wounded; but remained in active service to the close of the war, when he became a brig.gen., and later maj.gen., of militia. He was elected to the 3d U. S. cong. from S. C., and served 1809-13.

WYNTOUN, *win'ton*, ANDREW OF: old rhyming Scottish chronicler, in the beginning of the 15th c. Except that he was prior of the monastery of St. Serf on Loch Leven, and wrote *The Orygynale Cronykil of Scotland*, well known and valued by students of that kind of curious literature, scarcely anything is known regarding him. His work is not without historical importance; while philologically it has very distinct value, as a specimen of the old Scotch, then as nearly as might be identical with the contemporary dialect of England. The *Orygynale Cronykil* consists of nine books or cantos, of which only the last four pertain to Scottish history; the first five giving a fragmentary outline of the history and geography of the ancient world. From his quotations, W. seems to have been a well-read scholar for his time. In 1795 a splendid edition was published by Macpherson (revised and enlarged by D. Laing, 3 vols. 1872-79).

## WYOMING.

**WYOMING**, *wī-ō'mīng*: state; one of the United States of America; 44th in order of admission into the Union, 31st under the federal constitution; organized as a terr. from parts of Dak., Ida., and Ut., 1868; admitted as a state 1890, July 10; name derived from the Indian *Maughwauwame*, meaning 'plains.'

*Location and Area.*—W. is in lat.  $41^{\circ}$ — $45^{\circ}$  n., long.  $104^{\circ}$ — $111^{\circ}$  w.; bounded n. by Mont., e. by S. D. and Neb., s. by Colo. and Ut., w. by Ut., Ida., and Mont.; extreme length e. to w. 365 m.; extreme breadth n. to s. 275 m.; land surface 97,575 sq. m., water surface 315 sq. m., gross area 97,890 sq. m. (62,649,600 acres); cap. Cheyenne.

*Topography.*—The general surface is mountainous, with foot-hills, bold bluffs, innumerable 'buttes' or flat-top hills rising abruptly from plateaus, and broad rolling plains; mean elevation above sea-level about 6,000 ft.; range of extremes 3,000—14,000 ft. The state is traversed n.w. to s.e. by the main range of the Rocky Mts., and the subordinate ranges and spurs are known as the Wind River Mts. in the n.w.; Snow Mts. e. of the Wind river; Big Horn Mts. still further e. and in the n.; Rattlesnake Mts. s. of the Big Horn and near the centre of the state; Black Hills in the e., partly in W. and partly in S. D.; Medicine Bow Mts. in the s.; Sweetwater Range s. of Sweet river; and Bishop, Queen, and Horned Mts. near the s. boundary and e. of Green river. Though several of the great rivers of the continent, including the Missouri, the Colorado, and the Columbia, have their head-waters in W., and though there are about 600 streams of water, large and small, in the state, none of the water-courses are navigable, and their present value is chiefly for irrigating purposes (see *Agriculture*, below). The Yellowstone and its tributaries, the Big Horn, the Powder, the Little Missouri, and the Cheyenne, flow from the n. and empty into the Missouri; the Green river and its tributaries traverse the s.w. and empty into the Colorado; the Snake river is the chief tributary of the Columbia in the w.; and the n. fork of the Platte, with its many affluents, flows through the centre and s.e. parts. About 7,000,000 acres of surface are heavily timbered, and nearly as much more is sparsely timbered. The soil is generally a rich sandy loam, and where irrigated produces abundantly the cereals, vegetables, and fruits common to the n.w. states. The stock-raising industry comprised 1890 nearly one-half the total wealth of the state, and 1885 more than three-fourths; but the rapid extension of railroads is giving increased prominence to other interests.

*Climate.*—The climate is cool in summer, and from mild to intense in winter. There are but few snow-storms, but a large proportion of them are accompanied by fierce wind. The average winters are neither long nor severe, and the high mountains shield the valleys from the blizzards common elsewhere in the n.w. region. The rainfall averages 14 in. on the plains, and about 40 in. on the mountains; mean temperature  $46^{\circ}$  on the plains,  $36^{\circ}$  on the mountains; average of whole year through the state  $44^{\circ}$ .



## WYOMING.

*Geology.*—The geological surveys of the state, as far as completed by the state geologist, demonstrate that the out-cropping and underlying material forming its physical structure is greatly varied in character, nearly all the precious, superior, and baser metals being found in large quantities. The mineral wealth of the state aside from coal can hardly be said to be developed. Coal is found in every co.; extensive basins of petroleum are known to exist in the n.e., central, and s.w. parts; gold and silver bearing ores have been found and profitably worked in numerous localities; and other known properties of value are iron ore, gypsum, soda, salt, sulphur, copper, lead, tin, mica, marble, granite, sandstone, mineral paint, kaolin, fire-clay, graphite, cinnabar, magnesium, asbestos, nickel, and cobalt, the last two discovered 1892, May.

*Zoology.*—The mountain forests and foot-hills abound in wild animals, such as black and grizzly bears, wolf, wolverine, buffalo, elk, black-tailed deer, big-horn sheep, prong-horn antelope, and porcupine, mink, skunk, hare, rabbit, prairie-wolf, prairie-dog, etc. Among 124 species of birds are 12 varieties of birds of prey, and numerous game and song birds. Trout and other fish swarm in the streams.

*Agriculture.*—In 1880 the farm lands covered 124,433 acres (of which 83,122 were improved); comprised 457 farms, valued with fences and buildings at \$835,895; contained implements and machinery valued at \$95,482; had live-stock valued at \$5,007,107; cost for repairs and new buildings \$79,048; and yielded products valued at \$372,391. The principal products were: oats 22,513 bushels; hay 23,413 tons; Irish potatoes 30,986 bushels; wool 691,650 lbs.; milk 75,343 gals.; butter 105,643 lbs.; and cheese 2,930 lbs. The live-stock comprised 11,975 horses; 671 mules and asses; 718 working oxen; 3,730 milch cows; 273,625 other cattle; 140,225 sheep; and 567 swine. The principal products in 1902 were: oats 1,302,444 bush., value \$651,222; rye 9,414 bu., \$4,707; corn 47,203 bush., value \$27,850; barley 32,306 bush., value \$24,230; wheat 543,555 bush., value \$440,280; potatoes 396,114 bush., value \$241,630; hay 264,535 tons, value \$1,925,815. Live stock comprised (1902) 113,444 horses, value \$3,282,736; 1,481 mules, value \$78,292; 19,587 milch cows, value \$753,316; 796,060 other cattle, value \$18,553,928; 5,826,150 sheep, value \$14,306,695; 15,983 swine, value \$168,780. In 1900 there were reported 6,095 farms, covering 8,124,536 acres, of which 792,332 acres were improved, and 7,332,204 acres unimproved, and all farm property, including buildings, implements and machinery, and live stock, was valued at \$67,447,407.

W. is wholly within what has been called the 'arid region,' and while crops are raised in a number of localities without water artificially applied, yet irrigation is necessary in many places and beneficial in nearly all. In 1890 the state ranked 3d in the area of irrigated land, and 2d in the number and mileage of its irrigating canals. The state engineer (1889) divided W. into four natural divisions or

drainage systems, and ten water districts. There were 600 streams from which water was diverted for irrigation; 2,750 recorded ditches; 4,798 m. reported as total length; 24,973 total cubic ft. capacity per second; and 2,106,181 acres irrigated. The average of original cost of water right was \$6.62 per acre; average combined cost of land and preparing it for cultivation \$9.48 per acre; average value of improved and irrigated farm-lands \$31.20 per acre; and average annual cost of water 44 cts. per acre. The average cost of constructing ditches and distributing works in the state was \$5 per acre, making the total investment in irrigation works more than \$10,500,000, on which no taxes were levied. Federal aid was expected to secure the construction of storage reservoirs in various parts of the state.

*Manufactures and Mining.*—W. being an agricultural and mineral state, and still in the first stages of material development, has no distinctive manufacturing interests, and few general ones. In 1890 there were 334 manufacturing estab., which employed \$2,411,435 capital and 2,241 hands, paid \$1,386,140 for wages and \$1,885,449 for materials, and yielded products valued at \$4,301,240. Coal-mining has become a leading industry. The area underlaid with coal is believed by the state geologist to exceed 30,000 sq. m. The developed and shipping mines all are on the line of the Union Pacific railroad—chiefly at Carbon, Rock Spring, Almy, Glenrock, Douglas, and Buffalo. In 1890 the output of coal was given at 1,388,947 tons for the previous year, the value of the product being \$1,748,617; in 1893 was 2,439,311 tons, valued at \$3,290,904; and in 1901 was 4,485,375 tons, valued at \$6,060,462. Carbon co. contains a mine of mineral paint, which, owing to its superior quality as a preservative against rust, was used for painting the Brooklyn Bridge and the Elevated Railroad structure in New York.

*Railroads.*—The railroad development of the state has been rapid, and on this its future prosperity largely depends. In 1890 the lines were: the Union Pacific, which crossed the s. part of the state from Neb. to Ut., and had 489 m. of track within the state; the Cheyenne and Northern, from the Union Pacific to the Wyoming Central, 175 m.; the Oregon Short Line, from Granger to Ida. and Or.; the Denver Pacific and the Cheyenne and Burlington, extending s. and s.e. from Cheyenne; the Laramie North Park and Pacific, s.w. from Laramie City; the Wyoming Central, from the e. boundary w. to Casper, 150 m.; the Wyoming Eastern; and several minor lines—total mileage about 1,000. In 1901 the total mileage was 1,216.

*Religion.*—The Mormons are believed to have the strongest church organization in the state, though nearly all the large denominations are represented. The Rom. Cath. Church reported (1892) the diocese of Cheyenne (erected 1887), comprising the whole state, with 1 bp., 8 priests, 9 churches, 4 chapels, 43 missions, 1 acad., 2 parochial schools, 1 Indian school, 1 religious community of men and 3 of women, and estimated Rom. Cath. pop. 3,000. The Bapt. Church reported (1892) 1 state assoc. (organized



## WYOMING.

1891), 160 members, 235 Sunday-school pupils, church property valued at \$22,500, and contributions \$2,000. The Prot. Episc. Church reported (1892) the missionary district of Wyo. and Ida., comprising both states, with 27 clergy, 36 parishes and missions, 1,463 communicants, 76 Sunday schools, 600 pupils, and contributions \$16,843. The Congl. Churches reported (1891) 7 churches, 5 ministers, 337 members, 460 families, 646 Sunday-school members, and contributions for home expenditures \$9,898.

At the tenth international Sunday-school convention, Denver, Col., 1902, June 26-30, there were reported in W. 124 Sunday schools; 970 officers and teachers; 6,847 scholars; total members 7,967.

*Education.*—In 1880 W. had 2,907 children of school age (7-21 years) enrolled in the public schools, of whom 1,920 were in average daily attendance. There were 55 public schools of all grades, 70 teachers, school property valued at \$40,500, receipts \$36,161, and expenditures \$28,504. According to various acts of congress relating to W., both as a terr. and a state, 72 sections of the public domain were donated by the govt. for support of the Univ. of W.; sections 16 and 36 of each township were reserved for the benefit of the public schools; and the local authorities were authorized to lease the school lands in each co. for the erection of school buildings and the support of the schools, and to lease the univ. lands for the support of that institution. The act providing for the admission of the terr. as a state made further donations for the univ. and the public schools. In 1901 there were 14,512 children enrolled in the public schools, of whom 9,650 were in average daily attendance; 570 teachers, of whom 89 were men and 491 women; total expenditure \$253,551. The Univ. of W., at Laramie, chartered 1886, had (1902) 17 professors and instructors, 200 students, 15,250 vols. in library, \$85,900 in scientific apparatus, \$250,000 in grounds and buildings, and \$75,000 income; pres., Rev. E. E. Smiley, D.D. Under a general law, providing for the levy of a special tax of not less than one-eighth nor more than one-half mill on the real property valuation for the purpose, nearly every co. has a public library. There is a state library, and nearly all the churches and district public schools are similarly provided. Compulsory education is enforced through the state.

In 1902, Jan., there were reported 41 newspapers and periodicals, of which 4 were daily, 2 semi-weekly, 34 weekly, and 1 monthly.

*Illiteracy.*—Persons 10 years old and upward enumerated (1880) 16,479; unable to read 427, unable to write 556, whites unable to write 374; foreign-born whites enumerated 4,782, unable to write 197; colored persons 10 years of age and upward enumerated 1,239, unable to write 182. In 1890 the total population 10 years of age and upward was 47,755, illiterate 1,630, or 3.4 per cent.; males 32,675, illiterate 1,070, or 3.3 per cent.; females 15,080, illiterate 560, or 3.7 per cent. White population 10 years of age and upward 46,436, illiterate 1,408, or 3.0 per cent.; native

## WYOMING.

white 32,546, illiterate 427, or 1.3 per cent.: foreign white 13,890, illiterate 981, or 7.1 per cent. In 1900 the pop. of W. according to voting age was 37,898, of whom 1,636 were illiterates.

*Finances and Banking.*—In 1880 W. had a net territorial debt of \$17,000, co. debt \$169,377, and city and town debt \$19,085—total \$205,462; estimated real valuation \$4,485,290, personal \$9,136,538—total \$13,621,829; amount raised by taxation, territorial \$81,729, co. \$136,000, city, town, village, and school dist. \$12,499—total \$230,228.—In 1890 the state debt less sinking fund was \$320,000, all bonded; co. debts \$1,083,790; and municipal debts \$243,591—total \$1,647,381; state receipts \$216,393; expenditures \$236,720; aggregate property valuation \$30,665,499; amount raised by taxation \$182,913; and tax-rate 62 cts. on \$100. The state owned public buildings which cost with grounds about \$500,000; the cos., cities, and towns owned buildings, water and sewer systems, and other public property worth \$800,000; and the value of public-school property, exclusive of federal land grants, was estimated at \$700,000. The public buildings included the state capitol, at Cheyenne, which cost more than \$275,000; state univ., at Laramie, more than \$100,000; state penitentiary, at Laramie, erected by the federal govt., about \$75,000; state deaf, dumb, and blind asylum, at Cheyenne, about \$10,000; state insane asylum, at Evanston, about \$75,000; and a state penitentiary at Rawlins, building, to cost \$100,000. The total debt on 1903, Feb. 1, was \$280,000, all bonded. In 1902 the assessed valuation of all taxable property was \$43,348,356, and the tax rate \$5.625 per \$1,000. W. had (1902) 14 national, 11 state, and 10 private banks.

*History.*—A fur-trading post established at what is now Fort Laramie, 1834, is believed to have been the first white settlement in W. The larger part of the present territory of the state was acquired from France by the La. purchase 1803, the remainder was obtained from Mexico by the treaty 1848. In 1868 the Terr. of Wyo. was organized from the s.w. part of Dak. Terr., the n.e. of Ut., and the e. of Ida. Though containing several large reservations of Indians, the terr. was comparatively free from Indian troubles till 1876, when the entire n. part was overrun with hostile Indians and the command of Gen. George A. Custer (q.v.) totally destroyed. The tribes then in the terr. were the Sioux, Crows, Arapahoes, Shoshones, and remnants of others, and it was not till after Gen. George Crook (q.v.) succeeded in bringing them all to peace (1877) that substantial settlement and the development of industrial interests were possible. When Wyo. was admitted as a state, the only Indians in it were the Arapahoes and Shoshones, probably 2,000 in all, who occupied the Wind River reservation of 1,520,000 acres. They had become peaceful, and were making progress in education and agricultural pursuits. In 1891 the federal govt. arranged with these Indians for the cession to it of 1,100,000 acres for 55 cts. per acre. In the spring of 1892 an attempt to rid the state



## WYOMING.

of cattle-thieves led to such serious trouble that the gov. was compelled to call to his aid U. S. troops.

*Government.*—The executive authority is vested by the constitution (1889) in a gov., elected for 4 years, salary \$2,500 per annum; and a sec. of state, auditor, treas., and supt. of public instruction, each elected for 4 years, salary of each \$2,000 per annum. The gov. must be 30 years old and a resident of the state or terr. for 5 years, and cannot hold any other office during his term as gov. He has power to disapprove of any item or part of a bill without affecting the remainder. The other executive officers must be 25 years old and qualified electors.—The legislative authority is vested in a legislature, comprising (1903) a senate of 23 members, elected for 4 years, and a house of representatives of 50 members, elected for 2 years, salary of each, in first session, \$5 per day and 15 cts. mileage, permanent salary to be fixed by second legislature. The legislature meets biennially in odd-numbered years; and sessions after the first are limited to 40 days. Each branch of the legislature elects its own presiding officer and makes its own rules. Senators must be 25 years old and representatives 21. Every male and female citizen of the state is guaranteed equal civil, political, and religious rights; and every citizen of the United States 21 years old and upward, who has resided in the terr. or state one year and in the co. 60 days next preceding any election, is entitled to vote, except idiots, insane persons, and persons standing convicted of infamous crimes, and those who are unable to read the constitution of the state (unless only a physical disability prevents).—The judicial authority is vested in the senate, sitting as a court of impeachment; a supreme court of three judges, elected for 8 years, the first ones to be classified so that one goes out of office at the end of 4 years, one at the end of 6, and one at the end of 8, the one having the shortest term to serve to be the chief-justice; in district courts (3) with one judge each, the number of districts and judges to be increased by the legislature whenever necessary; in justices of the peace; in courts of arbitration; and in such other courts as the legislature may establish for incorporated cities and towns.—The state is prohibited from creating any indebtedness exceeding 1 per cent. on the assessed value of the taxable property in the state, excepting to suppress insurrection or to provide for the public defense; and counties, cities, towns, villages, and other subdivisions are limited in debt-creating power to 2 per cent. on taxable valuations, excepting that all such subdivisions may for specific purposes create an additional indebtedness not exceeding 4 per centum.

There were in W. 1891, Jan. 1, 327 post-offices, of which 2 were second-class, 12 third-class, 14 presidential, 313 fourth-class, and 91 money-order offices.

The successive govts., with their terms of service, are as follows: John A. Campbell 1869–75; John M. Thayer 1875–78; John W. Hoyt 1878–82; William Hale 1882–85; Francis E. Warren 1885–6; Thomas Moonlight 1886–89;

## WYOMING VALLEY.

Francis E. Warren 1889 (elected U. S. senator 1890); Amos W. Barber (sec. of state, act'g gov. 1890-93; John E. Osborne 1893-95; William A. Richards 1895-99; De Forest Richards 1899-.

*Counties, Cities, and Towns.*—W. was divided (1900) into 13 counties. In 1880 there were 7 *counties*, with pop., Laramie 6,409; Albany 4,626; Carbon 3,438; Uinta 2,879; Sweetwater 2,561; Johnson 637; and Fremont 239. The principal *cities and towns* were: Cheyenne 3,456; Laramie 20,181; Albany 13,084; Uinta 12,223; Carbon 9,589; Sweetwater 8,455; Converse 3,337; Fremont 5,357; Weston 3,203; Johnson 2,361; Crook 3,137; Sheridan 5,122; Big Horn 4,328; and Natrona 1,785; principal *cities*: *Cheyenne* 14,087; Laramie 8,207; and Rock Springs 4,363.

*Politics.*—State, congressional, and presidential elections are held on Tuesday after the first Monday in Nov. The state govt. (1903) was republican, with a party majority in the legislature of 17 in the senate, 42 in the house, and 59 on joint ballot.

*Pop.*—1880) 20,789; (1890) 60,705; (1900) 92,531.

**WYOMING VALLEY:** beautiful, fertile valley on the Susquehanna river, in Pennsylvania; 21 m. long by 3 wide, surrounded by mountains 1,000 ft. high, its name supposed to be a corruption of the Indian *Maughwarwame*—large plains. It was purchased about 1765 by a Connecticut company from the Delaware Indians; but the settlers were soon dispersed by hostile savages. In 1769 forty families came from Conn., but found a party of Pennsylvanians in possession, and for several years there were continual contests of the settlers with the Indians and with each other. The Conn. colony finally succeeded, and their town of Westmoreland had 2,000 inhabitants. In 1776 they armed for their own defense against the English and their Indian allies; but 1778 most of their troops were called to join the army under Washington. June 30 a force of 400 British provincials, or 'tories,' and 700 Seneca Indians, led by Col. John Butler, entered the valley, and were opposed by 300 men, under Col. Zebulon Butler. July 3 the settlers were driven to the shelter of Fort Forty, with the loss of two-thirds of their number, many soldiers and inhabitants being murdered; a half-breed Indian woman, called Queen Esther, having, in revenge for her son's death, tomahawked 14 with her own hand. On the 5th the remnant of the troops surrendered, and they and the inhabitants were either massacred or driven from the valley, which was left a smoking solitude. Campbell's *Gertrude of Wyoming*, founded on the stories of this disaster, contains exaggerations and misstatements, notably that of attributing the leadership to Brandt, who was not in the expedition. The disputes between the Conn. and Penn. settlers were not finally settled till the beginning of the 19th c. The valley is now one of the most flourishing districts in the state: the city of Wilkes-Barre (q.v.) is near its centre.



## WYTHE.

WYTHE, *with*, GEORGE: signer of the Declaration of Independence: 1726-1806, June 8; b. Elizabeth City co., Va. He received the equivalent of a liberal education at home, supplemented by some study at the Coll. of William and Mary; but, left an orphan before he was of age, he wasted much of his fortune in excesses. Reformed at the age of 30, he studied law, attained high rank in his profession, and was prominent as a member of the colonial assembly. As early as 1764, on a committee to remonstrate against the Stamp Act, he prepared a paper that went beyond the temporizing policy of his associates; and he was one of the earliest advocates of independence. From 1776, with Jefferson and Edmund Pendleton, he revised the colonial laws for the state. He was chosen speaker of the house of delegates, and a chancery judge 1777; later, chancellor in the court of equity, and while holding this office was prof. of law in William and Mary College, 1779-89. Removing to Richmond, he was in the convention that framed the constitution of the United States. He liberated his slaves, and assisted them in obtaining a livelihood. He died in Richmond. Thomas Jefferson was one of his pupils, and long afterward spoke of him in highest terms of praise as 'the honor of his own and the model of future times.'—He published *Decisions in Virginia by the High Court of Chancery, with Remarks upon Decrees of the Court of Appeals* (1795, 2d ed. 1852).

WYTHE, JOSEPH HENRY, M.D.: educator; b. Manchester, England, 1822, Mar. 19. Coming to the United States 1835, he first prepared himself for the ministry of the Meth. Episc. Church, and was licensed to preach 1842; but afterward studied medicine and graduated at the Pennsylvania Medical College 1853. He served as surgeon in the Union army during part of the civil war; was pres. of Willamette Univ., Or.—where he organized its medical dept.—1865-69; and after again spending some time as a Meth. Episc. preacher, he removed to San Francisco, and was chosen prof. of microscopy and histology in the Medical College of the Pacific. His publications include: *The Microscopist* (1850); *Curiosities of the Microscope* (1852); *Agreement of Science and Revelation* (1883); *Easy Lessons in Vegetable Biology* (1883); and *The Science of Life* (1884).

## WYTTENBACH.

WYTTENBACH, *vît'ên-bâch*, DANIEL ALBERT: Dutch classical scholar: 1746, Aug. 7—1820, Jan. 17; b. Berne, Switzerland; son of a theol. professor of Berne and Marburg, descendant of the Reformer Thomas W. He was one of four scholars in the Netherlands, beginning with Hemsterhuis, who instituted sound methods of criticism and especially laid the foundations of modern Greek scholarship. After education in the schools of Berne and Marburg, he entered the univ. in Marburg at 14 years of age. At the end of four years he turned from the theol. pursuits which his father had in view for him, and applied himself to Greek literature, then poorly taught. Ruhnken's notes on the Platonic lexicon of *Timæus* gave him new light and impulse, and he applied the same principles to emendation of the works of Julian; and, after coming under the tuition of Heyne at Göttingen, he made notes on other classic authors, which called forth from Ruhnken the declaration that he had not looked to find in Germany such knowledge of Greek, such power of criticism, and such mature judgment, especially in one so young. Encouraged by the two distinguished scholars Ruhnken and Valckenaer, he went to Leyden 1770; and by their recommendation he was made prof. the next year at Amsterdam, in the College of the Remonstrants, and continued there 8 years. About 1775 he began the publication of the *Bibliotheca Critica*, which was sustained by his own original researches for 30 years, and commanded the attention of the learned everywhere. In 1779 he was made prof. of philos., and in 1785 prof. of history and eloquence, and of Greek and Latin literature, at the Athenæum. He was invited by the Clarendon Press of Oxford to prepare an edition of Plutarch's *Moralia*; the first portion, notwithstanding the war between Holland and Great Britain, was safely conveyed to Oxford, but the rest was mislaid in transit, and the work did not appear until 1805. In 1799, on the death of Ruhnken, W. succeeded him at Leyden, and wrote a life of that scholar, a biography in Latin remarkable for beauty of style and for range of learning. In 1805 he had a narrow escape from the great gunpowder explosion which killed 150 people, including the Greek scholar Luzac, his colleague in the university. In his latter years he became nearly blind. After finishing the ed. of Plutarch's *Moralia*, the only important work from his hand was his well-known ed. of Plato's *Phædo*. He was very successful as a teacher, though busy in researches. Many honors were conferred on him at home and abroad. To secure a professor's pension to his niece, Johanna Gallien, who had been his housekeeper and secretary for 20 years, he married her shortly before his death. She was a woman of great attainments, wrote works of high repute, and at the tercentenary of the Univ. of Marburg the degree of doctor was conferred on her. W. died of apoplexy, and was buried in the garden of his country-house near Amsterdam. He was probably never surpassed in his acquaintance with the philosophical writings of the ancients. In common with the scholars in the Netherlands above mentioned, he was a critical student



## WYTTENBACH—WYVERN.

of language and texts, while such studies were neglected elsewhere except partially in England. Besides the works above mentioned, and Plutarch's *Animadversions*, he published *Præcepta Philosophiæ Logicæ* (1782); *Philomathia, sive Miscellanea Doctrina* (3 vols. 1809-17); and in addition to the many papers in his *Bibliotheca Critica*, there was printed the year after his death *Opuscula Varii Argumentii*, 2 vols. His select correspondence, with a Life, was published by one of his pupils, Mahne, 1823.

WYTTENBACH, *vit'ën-bâch*, THOMAS, D.D.: earliest of Swiss Reformers: 1472-1526; b. Bienne (otherwise called Biel), canton of Berne. He studied theology at Tübingen and Basle (Basle), and was appointed pastor of the town church of Bienne. At this time he had not dissented from the Roman doctrine and practice, and was sent by the town to Rome to obtain indulgences and the privilege of milk-diet in Lent. He defended the town church against encroachment by the civil authorities on the one hand, and on the other hand his independence as town priest against certain claims of the abbot of the Convent of St. John. In 1515, while retaining his office at Bienne, he temporarily resided at Basle, took the degree doctor of theology, and was made canon and custodian of St. Vincent's. But 1520 he returned to Bienne, resigning all his honors and emoluments at Basle, and preached against indulgences and the mass. Having denounced priestly celibacy, he married in 1524, was deprived of his charge, and preached in the open air. Seven other priests in the vicinity followed his example and married. Among the people he had many adherents, and 1525 they petitioned the council of Berne to grant him some support in his extreme poverty; but the council only asked the bp. of Lausanne to admonish him. The next year, however, shortly before his death, a pension of 12 florins was voted him for his losses in defense of the town priest against the abbot of St. John. Two years after his death the Reformation at Bienne was an accomplished fact.

WYVERN, n. *wi'vern* or *wiv'ern* [OF. *vivre*, a viper—from L. *vīpĕra*, a serpent (see VIPER)]: a fabulous creature representing a flying serpent, and so figured in heraldic coats of arms; it resembles a dragon, but has only two feet, which are like those of the eagle.

# X

**X, x, ěks:** 24th letter (19th consonant) of the Eng. alphabet, but the last letter of the Latin alphabet until B.C. 1st c., when *y* was added from the Greek. **X** is a double consonant, equivalent in Eng., as it was in Latin, to *ks* or *gs*, and is therefore superfluous. In form it corresponds to the Greek  $\chi$ , but in power to Greek  $\xi$ . Some Roman scholars did not acknowledge the character, but wrote *cs*, *gs* instead; and this substitution frequently occurs in inscriptions (e.g., *ucsoři*, for *uxori*). At one period of Roman literature, *xs* was often written for *x*—e.g., *saxsum*, *lexs*. In popular pronunciation the guttural element of the character gradually disappeared until, in the later period of the Empire, *x* was undistinguishable from *ss* or *s*; thus, inscriptions show *visit* for *vixit*, *milex* for *miles*. This change survives in modern Italian, which substitutes *ss* or *s* for the Latin *x* (as *sasso* = *saxum*; *straneo* = *extraneum*;) and uses *x* only in foreign words. In Spanish, in the beginning of words, *x* has a guttural sound, something between *ch* and *y*. In German the use of *x* is mostly confined to foreign words; in native words the sound is usually represented by *chs*, as *wachsen*, to wax or grow, though some write, e.g., *axe* for *achse*.—In algebra, *x* is the usual symbol for the unknown quantity which is to be determined. As a numeral, **X** stands for 10, and with a dash over it for 10,000; laid horizontally ( $\times$ ), it stands for 1,000.

**XALA'PA:** see **JALAPA**.

**XANTHATE**, n. *zăn'thăt* [Gr. *xanthos*, and chem. termination *-ate*]: a salt of Xanthic Acid (q.v.).

**XANTHAZARIN**, n. *zăn-thăz'a-rîn* [Gr. *xanthos*, yellow, and Eng. *alizarin*]: in *chem.*, a yellow coloring matter, prepared by the action of nitric acid on the black residue obtained in preparing pure alizarin. It is slightly soluble in water, easily soluble in alcohol, ether, and caustic alkalies, and may be converted into a crimson substance by heating with reducing agents.

**XANTHEINE**, n. *zăn'thē-în* [from Gr. *xanthos*, yellow, and *-ine*, chem. termination]: name given by Frémy to the insoluble coloring matter of flowers.

**XANTHELASMA**, n. *zăn'thē-lăz'ma* [Gr. *xanthos*, yellow; *ělasma*, a plate of metal hammered out]: a disease of the skin characterized by yellow, slightly raised patches of irregular outline most common around the eyelids.

**XANTHIAN**, a. *zăn'thĭ-an*: pertaining to or brought from Xanthus, an anc. town of Asia Minor (see **XANTHUS**).



## XANTHIAN MARBLES—XANTHINOCARPIN.

**XANTHIAN MARBLES**, *zăn'thî-an mâr'blz*: in *class. antiq.*, a large collection of marbles of various ages, from B.C. 545 onward, discovered near Xanthus, Asia Minor, 1838, and placed in the Brit. Museum, London, 1842-3.

**XANTHIC**, a. *zăn'thîk* [Gr. *xanthos*, yellow]: tending toward a yellow color; yellow or yellowish. **XANTHIC ACID**, a heavy oily, fluid acid ( $C_3H_6OS_2$ ), heavier than water, of penetrating, disagreeable odor, and very combustible. It is prepared by dropping carbon bisulphide into a solution of alcohol saturated while boiling with potash, until the liquid loses its alkaline character. It forms beautiful yellow salts. **XANTHIC OXIDE**, same as Xanthine (q.v.).

**XANTHINE**, n. *zăn'thîn* [Gr. *xanthos*, yellow]: a whitish powder ( $C_5H_4N_4O_2$ ), allied to uric acid, described first by Marcet, who regarded it as a very rare constituent of urinary calculi, and from its composition gave it the name *uric oxide*. It has been found to be a normal constituent of the human body, is a normal ingredient of human urine, and has been found in blood; in the brain, the spleen, the pancreas, and the liver of the ox; in the thymus gland of the calf; and in the muscular tissue of the horse, the ox, and of fishes; as well as in the liver of various animals; and is obtainable from guano. Calculi composed of this substance are extremely rare, are of light-brown cinnamon color, assume waxy appearance when rubbed, and consist of concentric layers easily separable from one another. X. occurs in very minute quantities in the various tissues. It can be prepared artificially by action of potassium nitrite on guanine and of sodium-amalgam on uric acid. When dried, it exists as a yellowish-white powder, which assumes a glistening appearance when rubbed, and shows no signs of crystallization under the microscope. It is nearly insoluble in cold water; is insoluble in alcohol and in ether; and when heated in contact with the air burns with the smell of burnt hair. X. seems, both chemically and physiologically, to be intermediate between uric acid and hypoxanthine. The composition of uric acid is represented by the formula  $C_5H_4N_4O_3$ , that of xanthine by  $C_5H_4N_4O_2$ , and that of hypoxanthine by  $C_5H_4N_4O$ . The two former occur together, not only in urine, but in the spleen, the liver, and the brain; while X. is not only invariably accompanied by larger or smaller quantities of hypoxanthine, but the latter can be made by the oxidizing action of nitric acid to yield a product from which X. (instead of hypoxanthine) may be obtained by a process of reduction. X. must be regarded as a higher stage of oxidation of hypoxanthine, and a product of the regressive metamorphosis of the tissues, which, in the ordinary condition of the system, is excreted in a more highly oxidized form of urea, uric acid, etc.

**XANTHINOCARPIN**, n. *zăn-thîn-ô-kâr'pîn* [from Gr. *xanthos*, yellow, and *Inocarpin* (q.v.)]: in *chem.*, a yellow coloring matter extracted from the juice which exudes from incisions made in the bark of *Inocarpus edulis*, of the order *Thymelacæ*, and tribe *Hernandia*.

## XANTHIPPE—XANTHOPHYLL.

**XANTHIPPE**, *zăn-thĩp'pē*: wife of Socrates (q.v.). B.C. 5th c. She acquired the reputation of having been an archtermagant, doubtless not without some foundation. It ought, however, to be remembered that her naturally infirm temper must have been not a little tried by the small concern manifested by Socrates in the regulation of his domestic affairs, which appears occasionally to have made X.'s domestic management very difficult. Socrates himself, it is known, had completely mastered his naturally strong appetites and passions, and had acquired a temper of perfect serenity. It is quite natural, then, that contrast-lovers and story-mongers should, as a foil, match so great a practical philosopher with a woman of such an ungovernable temper as is ascribed to his wife. According to Plato, she really loved her husband, and he at his death committed her tenderly to the care of his friends.

**XANTHITANE**, n. *zăn'thĩ-tān* [Gr. *xanthos*, yellow; -it, connective; suff. -ane]: a pulverulent mineral found associated with Zircon (q.v.) at Green River, N. C.: hardness, 3·5; sp. gr. 2·7 to 3·0. Analysis shows it to consist of titanitic acid, with traces of zirconia, and 12·5 per cent. of water. It results probably from the decomposition of Spheue (q.v.).

**XANTHITE**, n. *zăn'thĩt* [from Gr. *xanthos*, yellow, and -ite, a mineralogical terminative]: mineral of the garnet family, occurring in small greenish-yellow grains.

**XANTHO-**, *zăn-thō*, or **XANTH-**, prefix [Gr. *xanthos*, yellow]: yellow, used as the first element of many chemical and other terms and epithets, as *xanthodont*, having yellow teeth; *xanthospermous*, yellow-seeded, etc.

**XANTHOBETIC**, a. *zăn-thō-bē'tik* [prefix *xantho-*; mod. L. *beta*, beet-root]: of or derived from beet, and having a yellow color. **XANTHOBETIC-ACID**, n., in *chem.*, an acid extracted from the root of *Beta vulgaris* (an apetalous plant of the natural order *Chenopodiaceæ*), by cold alcohol. It is a reddish-yellow mass, very hygroscopic, has a sour taste, is soluble in water and alcohol, slightly soluble in ether.

**XANTHOCROI**, n. plu. *zăn-thōk'rō-ī* [Gr. *xanthocroos*, with yellow skin—from prefix *xantho-*, and Gr. *chrōs*, the skin]: in *anthrop.*, fair whites; Huxley's name for a people distinguished by yellow or red hair, blue eyes, and fair complexion, who extended in early times from w. and central Asia into e. and central Europe. The farthest limit of the Xanthocroi n. is Iceland and the British Islands. S.-westward they are traceable through the Berber country, and in the Canary Islands. **XANTHOCRO'IC**, a. -*thō-krō'ik*, having a fair skin; of or belonging to the Xanthocroi.

**XANTHOPHYLL**, n. *zăn'thō-fĩl* [Gr. *xanthos*, yellow; *phyllon*, a leaf]: the yellow coloring matter contained in the leaves of trees in autumn, the result of the decomposition of Chlorophyl (q.v.); also called *xanthophylline*. **XANTHOPHYLLITE**, n. -*thōf'ĩ-lĩt*, a mineral of a yellowish color and foliated texture, occurring in talcose schists, and allied to mica.



**XANTHORHAMNINE**, n. *zăn-thō-răm'nîn* [prefix *xantho-*; Eng. *rhamnine*]: in *chem.*, yellow coloring matter ( $C_{23}H_{28}O_{14}$ ), obtained by boiling coarsely-ground Persian berries (the fruit of *Rhamnus infectorius*, and other species of *Rhamnus*: see RHAMNACEÆ) with alcohol, filtering, and allowing the filtrate to crystallize. It forms tufts of pale yellow shining crystals, soluble in water and alcohol, insoluble in ether.

**XANTHORHIZA**, n. *zăn-thō-rî'za* [from prefix *xantho-*, and Gr. *rhiza*, a root]: in *bot.*, a genus of *Ranunculaceæ*. *X. apiifolia*, an undershrub, is one of the plants called yellow-root: it grows in shady places on mountains from w. N. Y. and Penn. southward. Its root and pith, and the inner layers of wood, are bright yellow, and were used by the Indians as a yellow dye. It yields a gum and a resin, both intensely bitter, as are the wood and bark. It is prescribed as a simple tonic.

**XANTHORRHŒA**: see GRASS TREE.

**XANTHOSPERMOUS**, a. *zăn-thō-spēr'mūs* [prefix *xantho-*, and Gr. *sperma*, seed]: in *bot.*, having yellow seeds.

**XANTHOUS**, a. *zăn'thūs* [Gr. *xanthos*, yellow]: yellow-yellow-skinned: applied to the Mongolian type of man; kind.

**XANTHOXYLUM**, or **ZANTHOXYLUM**, *zăn-thōks'î-lŭm*: genus of trees and shrubs, type of the nat. order *Xanthoxylaceæ*, closely allied to *Rutaceæ*, and distinguished from it chiefly by unisexual flowers, including more than 100 known species of trees and shrubs, having opposite simple or pinnate leaves with pellucid dots, and no stipules, chiefly natives of warm climates, particularly of warm parts of America. The order is generally characterized by pungent and aromatic qualities, which are strongly developed in the genus *X.* itself. The Northern Prickly Ash (*X.* or *Z. Americanum*), shrub with axillary clusters of flowers appearing before the leaves, with pods short-stalked, and with leaves somewhat like those of the ash, is common from Canada to Va., and is called TOOTHACHE TREE, from the use made of the hot acrid bark and capsules for relief of toothache. It is also in high repute in parts of the United States as a remedy for chronic rheumatism, for which it is administered in the form of powder, in doses of ten grains to half a dram three times a day. The Southern Prickly Ash (*X.* or *Z. Carolinianum*) is a small tree on sandy coasts from Va. s., and has the flowers in a terminal cyme, and the pods sessile. Some of the species are popularly called PEPPERS in their native countries, as in India and Japan, where they are used as a substitute for pepper. The bark of *X. Americanum* is a powerful sudorific and diuretic, and other species possess similar qualities; some are febrifugal, and the seeds and unripe capsules of some are gratefully aromatic.—To the order *Xanthoxylaceæ* belong the AILANTUS (q. v.) and the WHITE IRON-WOOD (*Vepris undulata*) of the Cape of Good Hope, the wood of which is very hard and tough, and is much used for agricultural implements.

**XANTHURA**, n. *zăn-thū'ra* [prefix *xanth-*; Gr. *oura*, the tail]: in *ornith.*, genus of Amer. jays of beautiful and resplendent hues; there are three species, ranging from equatorial America n. to Mexico and Texas.

**XANTHUS**, *zăn'thūs*: city, cap. of ancient Lycia, anciently called Arina, a city of the Tramilæ, or Solymi, the primitive inhabitants; at the s.w. corner of Asia Minor, and near the village of Kounik. From the earliest historic times to that of Cræsus, the Lycians appear to have been independent under native rulers; but after the fall of Sardis and the capture of Cræsus, the Persian conqueror Cyrus sent an army for the conquest of Lycia, led by Harpagus, B.C. 546. The most desperate resistance was made by the Lycians, and the people of X. burned themselves in their citadel, rather than surrender to the conqueror, only 80 families surviving the catastrophe. Reduced to a Persian satrapy, they sent 50 ships to the expedition of Xerxes against Greece, and contributed to the revenues of Persia. Little is known of the history of this town till the days of Alexander the Great. Alexander took X., which is said to have made as determined a resistance as it did on the former occasion. In the war which ensued among the successors of Alexander, Ptolemy took X. from the garrison of Antigonus; and the city subsequently passed into the possession of the Ptolemies and Seleucids. After the defeat of Antiochus, it was ceded by the Romans to Rhodes, but subsequently had its liberties restored. In the civil war between Brutus and the Triumvirs, B.C. 43, X. was taken by Brutus. The inhabitants a third time destroyed themselves and their families, and few survived the capture. From that time X. belonged to the Roman empire, and suffered in the earthquake in the reign of Tiberius; but Lycia did not lose all its freedom till the time of Claudius, who reduced it to a province.—X. was situated 70 stadia, or 9 m., from the sea, on the left bank of the Sibres or Sibrus, the Greek Xanthus, or Yellow river, on a plateau of elevated ground, of nearly rectangular shape, the elevated parts close to the river rising 200 ft. The most remarkable edifices in the city and its vicinity, according to ancient authors, were the Sarpedonion, or Temple of Sarpedon; that of the Lycian Apollo; and Letôon, or Temple of Leto. On the elevated ground, or Acropolis, stood the so-called Harpy Tomb, and an ancient theatre of Greek workmanship; while in the other part of the city which lay to the east was a mixture of Greek and Roman buildings. The whole city and its environs contained numerous temples and tombs. The discoveries of Sir C. Fellows 1838 revealed the city of X., its temples and its monuments, and they appear to be of the following classes: 1. The sepulchres of the early inhabitants, inside the wall, in shape of square columns, with step-shaped bases, and sepulchral chamber on the summit; the most remarkable of these is the Harpy Tomb, so called from the subject of the bas-reliefs being the Harpies bearing off the daughters of Pandarus, King of Lycia—executed in a style resembling the earliest efforts of oriental Greek art. Another is not-



able, with a frieze of lions and hunters in Persian style, and the inscribed obelisk, with long Lycian inscription and some Greek verses, apparently of the time of Artaxerxes Longimanus, and made about B.C. 466. 2. The tombs of the age of the Persian subjection, with roof-shaped tops and ridges, and imitation of woodwork, the sepulchral chamber for the principal dead being at the summit, the others in the middle and base, the sides ornamented with reliefs of a later style of art. Of later style, but of more beautiful art, was the Ionic peristyle temple or monument of 14 columns, with a solid cella, placed on a base or pedestal, both temple and base ornamented with friezes, supposed to represent the conquest of Lycia by Harpagus, and with figures between the columns. The friezes represent hunts and feasts, the combats of Lycians and Persians, and taking of the city of X. by the latter—the whole treated in a style not unlike the school of Phidias and his successors. These sculptures have been supposed to represent the exploits of Harpagus, or the suppression of the revolt of the Cilicians by a Lycian satrap, and to have been made between B.C. 450 and 387. This temple was discovered by Sir C. Fellows 1840-44.

The language found on the monuments of Lycia, written in an alphabet of 25 letters, is an Aryan dialect, distinguished by prevalence of vowels. The letters, with two exceptions, are archaic Greek, and borrowed from a form not oldest of that language. The syntax and inflections are Aryan or Indo-European, but many of the roots are different from the languages of that family, though certain words may be referred to well-known equivalents—as *godā*, 'lord,' to the Persian; *tedeeme*, 'son,' to the Slavonic; and *ladé*, 'wife,' to the Anglo-Saxon. Some words, too, resemble the Zend. The presence of many Greek words barbarously transcribed can also be well recognized in the different inscriptions, and a few derived from their Persian conquerors—as *gssatrape*, or 'satrap.' The inscriptions are generally short and sepulchral, and follow the well-known formula common under the Roman empire, and are sometimes accompanied by Greek versions or translations, helping to explain the Lycian. Only one inscription, recording the exploits of one of the family of the Harpagi after the battle of Eurymedon (B.C. 466), on the so-called obelisk of X., is of any length. The language seems to have lasted from about B.C. 5th c. to the 1st c. after Christ.—Rawlinson, *Herodotus*, I. 311, 673; *Synopsis of the Contents of the Brit. Museum*, 1855, p. 105; Fellows, *Asia Minor* (Lond. 1839); *Discoveries in Lycia* (1841); Birch in the *Archæologia*, XXX. 176-204.

## XAVIER.

XAVIER, *záv'í-ér*, Sp. *chá-ve-är'*, FRANCISCO (SAINT): celebrated missionary of the Rom. Cath. Church: 1506, Apr. 7—1552, Dec. 2; b. at his mother's castle of Xavero or Xavier, in Navarre; of noble family, being son of a privy councilor of the king of Navarre. Having received his early education at home, he was sent in his 18th year to the College of Sainte Barbe, at Paris, where he made the acquaintance of Ignatius de Loyola (q.v.), with whom he ultimately became associated in the foundation of the Jesuit Society: for so much of his history as regards the establishment of the order, and the early labors of its founders in Rome, see JESUITS. While engaged in these early labors of the society in Rome, X. attracted the notice of the representative of John III. of Portugal at Rome, Govea, who suggested to the king the idea of sending out members of the new order as missionaries to the Portuguese colonies in the East. X. was chosen for this purpose instead of Bobadilla, who had been originally appointed, but was prevented by sickness from going on the expedition. Having sailed from Lisbon 1541, Apr. 7, and wintered at Mozambique, he arrived at Goa 1542, May 6, and presented to the bishop his letters of authorization from Pope Paul III. X.'s first proceeding, on finding the excessively depraved condition of the European Christians settled in India, was to endeavor, by stirring up among them a spirit of penance and religious fervor, to remove the great obstacle to the efficacy of his preaching to the native population, which was presented by the evil example of the professing Christians of the colony. His efforts in this preliminary reformation were successful, and he was equally blessed in his labors among the pearl-fishing population of the coast, from Cape Comorin to the island of Manaar. After a stay of more than a year in this region, he returned to Goa, and with a fresh staff of assistants visited the kingdom of Travancore, where in a single month he baptized 10,000 natives. Passing thence to Malacca, where he was reinforced by three other Jesuit missionaries, sent by Ignatius de Loyola in compliance with X.'s earnest solicitations, and having achieved great success among the residents of the coast, he proceeded 1546 to the Banda Islands, to Amboyna, and the Moluccas. In all these places his success was extraordinary. Having thus effected an introduction of the gospel in many places, he resolved to retrace his steps, and revisit the several scenes of his preaching. He arrived at Malacca 1547, and thence by Manassar, near Cape Comorin, where he stayed for some time, he passed to the island of Ceylon, where he converted the king of Kandy, with many of his people. In 1548, May, he returned a second time to Goa. His great object now was to carry out a project for the conversion of the Japanese empire, which had been suggested to him by a Japanese of high rank, whom he had attached to himself at Malacca, and who accompanied him to Goa. This Japanese, whom, with two of his domestics, he converted and baptized, became a most valuable auxiliary. Through his aid, X. was enabled during the voyage to acquire so much of the Japanese language as enabled him to translate into

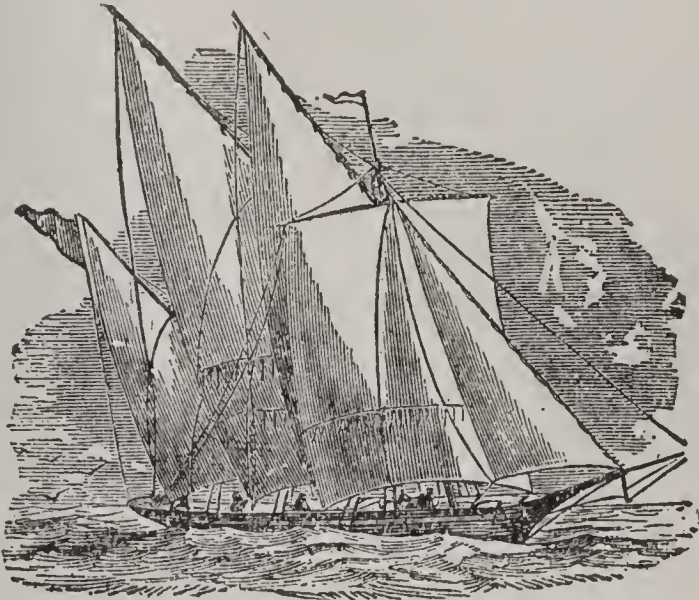


Japanese and explain the Apostles' Creed; and though his success in the first island which he visited was insignificant, yet at Firando, and afterward at Miako, his preaching was attended with extraordinary fruits. At Miako he had failed signally on his first visit, which was made in a poor and humble guise; but having returned with a more imposing train, and under circumstances of greater outward distinction, he obtained a ready and favorable hearing, and made so lasting an impression that the mission which he founded flourished for more than 100 years, until the final expulsion of Christianity from the Japanese empire. His mission to Japan occupied about two and a half years; and 1551, Nov., he sailed from Amanguchi for the purpose of returning to Goa to organize a mission to China. Touching at Malacca on his voyage, he endeavored to concert with the governor an embassy in the name of the king of Portugal to China, under cover of which he hoped to effect an entrance for his missionary enterprise; but on his return from Goa to Malacca, he found a new governor, who was opposed to any such attempt; and he was obliged to adopt the expedient of sailing in a merchant-ship to the island of Sancian, near Macao, which was at that time the trading-depot of the Chinese with the merchants of Portugal. From Sancian, X., having procured a Chinese interpreter, hoped to induce one of the native merchants to land him secretly on the coast; but in this hope also he was baffled by the fears of the Portuguese, who dreaded for themselves the vengeance of the Chinese authorities on this infraction of the law. This disappointment, coupled with the privations and labors to which he had been exposed, brought on a violent fever, and under the combined weight of mental depression and physical sickness this Christian hero sank on the very threshold of what he had looked to as the great enterprise of his life. He died in the island of Sancian. His remains were conveyed to Malacca, and thence with great solemnity to Goa, 1554, Mar. 15.—Many miracles, attested by numerous witnesses, were reported of X. in almost all the stages of his career. Among these miracles, some witnesses reckoned the miraculous gift of tongues. The evidence of these miracles was submitted to the usual process of inquiry at Rome, and, many miracles having been established by the ordinary canonical process, X. was 'beatified' by Paul V. 1619, and 'canonized' by Gregory XV. 1622, his festival being Dec. 3. His only literary remains are a collection of Letters, in 5 books, 8vo (Paris 1631), and a Catechism, with some short ascetic treatises. His Life, by Père Bouhours, was translated by James (brother of John) Dryden. There is also a Latin Life by Tursellino (Rome 1594); in Italian by Bartoli and Maffei; in German by De Vos (1877); and in English by Venn (1862) and Coleridge (1873).

XEPEC, n. *zē'bēk* [Sp. *xabeque*; Port. *zabeco*; F. *chebec*—from Turk. *sumbaki*, a kind of Asiatic ship]: armed vessel of great speed, formerly used by the Algerine corsairs. It carried three masts, on which square or lateen sails could be set. The bow and stern were remarkable for the small

## XENIA—XENIUM.

angle that they made with the water. The sides were low, and the upper deck of great convexity, that the water might readily flow off through the scuppers. As this rendered them inconvenient for walking on, gratings were laid at the sides of the deck to avoid the convexity. The crew walked dry on these gratings, while the water flowed out underneath. Xebecs carried 16 to 24 guns. A few of



Xebec.

these vessels—unarmed—still sail the Mediterranean as carriers of perishable goods.

**XENIA**, *zē'nī-a*: city, cap. of Greene co., O.; on Shawnee creek, 3 m. from the Little Miami river; and on the Cincinnati Dayton and Ironton, the Pittsburgh Cincinnati and St. Louis, and the Dayton Fort Wayne and Chicago railroads; 52 m. s.w. of Columbus, 65 m. n.e. of Cincinnati. It is in an agricultural region that is highly cultivated and supplied with abundant water-power; is regularly laid out; and has broad streets with finely shaded sidewalks, gas and electric light plants, water and sewerage systems, paid fire dept. with steam-engines, and a beautiful public park. The city contains about 20 churches, 8 public schools of various grades, 2 national banks (cap. \$200,000), 1 private bank, and 1 daily, 1 semi-weekly, 3 weekly, and 1 monthly periodicals. The industries comprise planing and saw mills, glass works, marble and granite works, oil-mills, and twine, pump, carriage and wagon-factories. The notable buildings include city hall; courthouse; State Soldiers' and Sailors' Orphans' Home; Greene Co. Infirmary; Xenia College (Meth. Episc.), opened 1851, for both sexes; United Presb. Theol. Seminary of Xenia; and, near by, Wilberforce Univ. (African Meth. Episc.), opened 1856, whose normal dept. is in X.—Pop. (1880) 7,026; (1890) 7,301; (1900) 8,696.

**XENIUM**, n. *zē'nī-ŭm*, **XENIA**, n. plu. *zē'nī-a* [L.—from Gr. *xenion*, a gift to a stranger—from *xenos*, a stranger]: in Gr. *antiq.*, a present given to a guest or stranger, or to a foreign ambassador.



## XENOCRATES—XENOPHANES.

**XENOCRATES**, *zē-nōk'ra-tēz*, of Chazedon: ancient philosopher: B.C. 396-314; b. Chalcedon. At an early age he attached himself to Plato, and rose to such esteem for proficiency in philosophy and high moral character, that he was thought worthy of succeeding Speusippus, Plato's successor, in the presidency of the Academy. This post he filled creditably for 25 years. He wrote numerous treatises on dialectics, physics, and ethics, and drew with unusual precision the boundaries between these three departments of philosophy. Of these works, merely the titles have been preserved; and what is known of his doctrines is gathered only from fragmentary notices of them in various authors. He introduced into the Academy, to a greater degree than before, the mystic Pythagorean doctrine of numbers in connection, with the *ideas* of Plato. Zeus, the father, ruling in heaven, he called Unity, as being uneven number and spirit; the World-soul, which operates through all things liable to motion and change, he styled Duality. This divine world-soul dwells in the heavenly bodies, the Olympic gods, the elements of nature, also in terrestrial demons, whom he regarded as intermediate between gods and men. In his ethical teaching he aimed at making the Platonic doctrines more directly applicable to ordinary life in individual cases, and pitched his standard of excellence very high. He held that virtue is in itself valuable, while other things are valuable only conditionally, and that it extended to thoughts as well as actions. He was himself of irreproachable character, of well-balanced mind, and temperate in his habits without cynicism. His conversion of the youthful debauchee Polemo into an earnest, virtuous man, and his disregard for wealth, as shown by his refusal of the offers of Philip and Alexander, are the best known incidents in his long, useful, and virtuous career.

**XENODOCHEUM**, n. *zēn-ō-dō-kē'ūm*, or **XENODOCHUM**, n. *zēn-ō-dō-kī'ūm* [Gr. *xenodocheion*—from *xenos*, a stranger; *dechomai*, to receive]: in *Gr. antiq.*, a building for the reception of strangers; also in modern usage, a guest-room or guest-house in a monastery.

**XENOPELTIS**, n. *zēn-ō-pēl'tīs* [from Gr. *xenos*, strange, and *peltē*, a shield]: in *zool.*, a genus of snakes or serpents, typical of the family *Xenopeltidae*. There is but one species, *Xenopeltis unicolor* (*Tartrix xenopeltis*), a curious nocturnal carnivorous snake, ranging from Penang to Cambodia, and through the Malay archipelago to Celebes.

**XENOPHANES**, *zē-nōf'a-nēz*, of Colophon: reputed founder of the Eleatic School of Philosophy: b. at Colophon, in Asia Minor, probably between B.C. 530 and 550; or, according to some, about B.C. 580; d. (as inferred from some passages in his writings) at the age of about 92. He spent the greater part of his long life in banishment. He passed many years in Sicily, and resided for some time at Elea (whence adj. *Eleatic*), in Lucania. He composed many poems historical, didactic, and elegiac, which have perished, except a few fragments. He used his poetry to

disseminate his philosophical tenets. He was the first to maintain the Eleatic doctrine of the oneness of the universe (see ELEATIC SCHOOL); and recognizing clearly the unity and perfection of the deity, he attacked the prevalent mythology and the practice of attributing to the god-head a human form and human weaknesses. He was thoroughly earnest, but his logic was confused and contradictory. While he held the existent to be identical with the deity, and regarded it as the basis of phenomena, he maintained also that the divine essence was neither finite nor infinite, neither moved nor unmoved: not finite, for then it must be limited by another, whereas God is one; nor, on the other hand, infinite, for only non-being is infinite, as having neither beginning, middle, nor end. The distinguishing tenet of X. is his Monotheism; and, as a philosophical rhapsodist, he sought to inculcate it, though he failed to express it in a clear and systematic manner. His speculations are skeptical in their tendency, and appear to have had great influence on succeeding philosophers. His explanations of physical phenomena were crude; but one is recorded in which he has anticipated modern geology: from the shells and marine petrifications found on mountains and in quarries, he inferred that the surface of the earth had risen gradually out of the sea, whereas in the 18th c. even Voltaire could give no better explanation of the fact of sea-shells being found on the mountains of Spain than the supposition that they were the scallop-shells dropped by pilgrims journeying to and from the shrine of St. James.

XENOPHON, *zěn'ō-fŏn*: Greek soldier, historian, and philosopher: about B.C. 430-357 or later; b. Athens; of the knightly order. He early became a pupil of Socrates, and is said to have been saved from death by that philosopher at the battle of Delium, though recent investigations show that X. was too young to be in that battle. At the age of about 30 he joined the expedition of the younger Cyrus against his elder brother, Artaxerxes Mnemon, King of Persia. After the battle of Cunaxa, and the treacherous massacre of the Greek generals, X. bore a most important part in the adventurous retreat known in history as the Retreat of the Ten Thousand (see TEN THOUSAND, RETREAT OF THE); and it was mainly his courage, tact, and conduct that gave it success. After his return to Asia Minor, X. incorporated his forces with a Lacedæmonian army which had crossed into Asia to wage war with the Persian satraps; and leading a portion of them on a pillaging expedition, he amassed wealth enough to enable him to live the life of a country gentleman. Before retiring, he served under Agesilaus, the Spartan general against the Persians; and at Coronea fought against his own countrymen, the Athenians. Sentence of banishment had been previously passed on him at Athens, probably for his share in the Cyrean expedition. His sympathies were entirely Spartan. He soon afterward settled at Scillus, a small town near Olympia, in Elis, under Spartan protection, where he lived more than 20 years, occupying himself with



## XERASIA—XERES-DE-LOS-CABALLEROS.

hunting, agriculture, and writing. He is not mentioned as having ever returned to Athens, though his sentence of banishment was repealed, and his two sons were in the Athenian division which aided the Spartans at Mantinea. At last X. was driven from his retreat at Scillus by the Eleans, and took refuge in Corinth, where, probably, he died. His works are numerous, and, to judge by their titles and number, all extant. His style is simple, elegant, though rather monotonous and deficient in vigor. As a philosopher he holds no very high rank. He had excellent practical talents, and was a humane, sensible, religious man; but seems to have had neither genius nor taste for speculative philosophy. Modern researches tend to establish the accuracy of his historical, geographical, and ethnological statements. His principal works are the *Anabasis*, or narrative of Cyrus's expedition with the Retreat of the Ten Thousand; a History of Greece in continuation of Thucydides; the *Cyropædia*, or education of Cyrus the Elder—a sort of political romance, in which Cyrus is drawn as the model of a wise and good ruler: in this work, X. clearly shows his preference of a well-regulated monarchy to the democracy of Athens. He wrote, besides, the Reminiscences (*Memorabilia*) of Socrates, a series of dialogues intended to refute the charges on which that philosopher was executed; also treatises on Hunting, on the Horse, the Revenues of Athens, and Domestic Economy.

**XERASIA**, n. *zē-ra'sī-ă* [Gr, *xērasīā*, dryness—from *xēros*, dry]: in *med.*, a disease of the scaip characterized by dryness.

**XERES-DE-LA-FRONTERA**, or **JEREZ-DE-LA-FRONTERA**, *chā-rēth'dā-lā-fron-tā'rā*: important town of Spain, province of Cadiz; 14 m. n.e.-by-n. from Cadiz; near the right bank of the Guadalete, and on the railway between Cadiz and Seville. The houses are generally well built, and the streets and squares clean, spacious, well paved, and well lighted. The wealthy wine-merchants mostly reside in the suburbs. X. is an ancient town supposed by many to be the *Asta Regia Cæsariana* of the Romans. It has manufactures of woolen cloth and leather, and considerable grain trade; but these are of little importance in comparison with its wine trade. *Sherry* derives its name from Xeres-de-la-Frontera. Some of its *bodegas*, or wine-stores, are of vast dimensions; they are not wine-vaults, but stores erected above ground. The greater part of the wine of X. is exported to England; and some of the principal wine-merchants are of French and Scottish extraction.—Pop. (1877) 64,533; (1887) 61,708.

**XERES-DE-LOS-CABALLEROS**, or **JEREZ-DE-LOS CABALLEROS**, *lōs-kā-vāl-yā'rōs* (anc. *Esuris*): town of Spain, province of Badajoz; 40 m. s. of Badajoz. X. is a picturesque old town, partly surrounded by a Moorish wall. The ecclesiastical edifices are remarkably numerous. There are manufactures of woolen and linen cloth. Among chief articles of trade, besides the product of the manufactures, are pigs and fruit.—Pop. (1887) 8,471.

## XERIFF—XERXES.

**XERIFF**, n. *zēr'ĭf* [Turk]: a gold coin formerly current in Egypt and Turkey, value about \$2.27; a name used in Morocco for the ducat.

**XERODERMA**, n. *zē'rō-dēr'mă* [Gr. *xēros*, dry; *derma*, skin]: in *med.*, a dry and parched state of the skin which in its severest form is known by the name of *ichthyosis*, or fish-skin disease.

**XERODES**, n. *zē-rō'dēz* [Gr. *xēros*, dry]: a tumor attended with dryness.

**XEROPHAGY**, n. *zē-rŏf'ă-jĭ* [Gr. *xēros*, dry; *phagein*, to eat]: the habit of eating dry food only.

**XEROPHILE**, n. *zē'rō-fĭl* [Gr. *xēros*, dry; *philēō*, I love]: in *bot.*, a plant which requires a large amount of heat and but little moisture. **XEROPHILOUS**, a. *zē-rŏf'ĭ-lŭs*, of or pertaining to such plants.

**XERXES**, *zērks'ēz*, I., King of Persia: reigned B.C. 485-464; d. B.C. 464; eldest son of Darius and his second wife, Atossa, daughter of Cyrus. He was appointed successor by his father, in preference to Artabazanes, his eldest son by his first wife. Darius died B.C. 485, in the midst of his preparations for a third expedition against Greece. X., after having subdued the rebellious Egyptians, gave his whole attention to completing the preparations begun by his father, which occupied nearly four years. Immense hordes of men were gathered from all parts of the vast Persian empire, and an enormous fleet was furnished by the Phœnicians to Persia. A bridge of boats, a mile in length, under the superintendence of Egyptians and Phœnicians, was built across the Hellespont. The bridge, however, was destroyed by a storm, on which X. is said to have beheaded the engineers, and to have ordered 300 lashes to be administered to the rebellious sea, and a set of fetters to be cast into it. Another bridge, of a double line of boats, was built; and a canal was cut through Mt. Athos, at the point of the peninsula of Acte, in Macedonia, on which the fleet of Mardonius had been wrecked B.C. 492. The preparations were completed B.C. 481, and in the autumn X. arrived at Sardis, where he wintered. In the spring of the following year, the vast assemblage began to march toward the Hellespont; and, according to Herodotus, seven days and nights were occupied in their march across the bridge. After crossing the Hellespont, the march was continued along the Thracian coast toward Doriscus, on the Hebrus, where a halt was made on a large plain, and the army numbered. The fleet drew up near to Doriscus. According to Herodotus, the whole number of fighting-men, military and naval, amounted to nearly 2,500,000, and the fleet consisted of 1,207 ships of war, besides 3,000 smaller vessels. These numbers were considerably increased during the march between Doriscus and Thermopylæ by the Thracians, Macedonians, Magnesians, and other nations through whose territories X. passed on his way to Greece. Herodotus supposes that the number of camp-followers, exclusive of eunuchs and women, would amount to more than that of the fighting-men; so that, ac-



## XERXES.

According to him, the whole number of people assembled on this occasion would be considerably over 6,000,000. This number is doubtless greatly exaggerated; still, it cannot be doubted that this was one of the greatest multitudes of men ever brought together for any purpose under the sun. Grote, who discredits the immense numbers given by Herodotus, nevertheless says: 'We may well believe that the numbers of Xerxes were greater than were ever assembled [on any other occasion] in ancient times, or perhaps at any known epoch of history.' This immense force moved on without resistance through submissive nations till it reached Thermopylæ (q.v.), where it was brought to a stand by the army of Leonidas (q.v.). Although the Greeks were entirely defeated and slain, it was not without heavy loss to the Persians. On the same day, and on the third day afterward, the Persian fleet, which had previously suffered severely from a storm, was defeated with heavy loss by the Greeks off Cape Artemisium, in Eubœa. X. continued his march on to Athens through Phocis, which he laid waste, and Bœotia, whose inhabitants joined him, except those of Plataea and Thespia, which cities he burned. A detachment which he sent to attack Delphi met signal defeat. When X. arrived at Athens (in the summer of 480, three months after crossing the Hellespont), he found the city deserted, the Athenians having sent their families to Trœzen, Ægina, and Salamis. Athens was destroyed. Meantime the two fleets had sailed round from Eubœa and taken up their positions in the narrow strait between Salamis and the Attic coast, where the famous naval battle of Salamis took place (B.C. 480, Sep.): see SALAMIS. X. witnessed the fight from a lofty throne which he had caused to be erected on one of the slopes of Mount Ægaleus,

'The rocky brow  
Which looks o'er sea-born Salamis.'

X. was apparently confounded at the unexpected and inglorious result of all his mighty preparations for the overwhelming of Greece; and, becoming alarmed for his personal safety, fled, under an escort of 60,000 men, with all haste toward the Hellespont, which he reached in 45 days. The bridge of boats having been again destroyed by a storm, he crossed over to the Asiatic coast in a vessel. Mardonius was left with 300,000 men to carry on operations in Greece. In B.C. 479 the Greeks defeated Mardonius in the famous battle of Plataea (q.v.), and on the same day gained another victory over the Persians at Mycale, in Ionia. Next year (B.C. 478) the Persians lost their last possession in Europe by the capture of Sestos, on the Hellespont. The war was continued a few years longer, though the struggle was now virtually at an end. Little more is known of the personal history of X., except that (B.C. 464) he was murdered by Artabanus, who aspired to the throne; and was succeeded by his son Artaxerxes. From all that is known of X., he appears to have been utterly ignoble in character, vainglorious, licentious, cruel, cowardly—the very type of the worst kind of Eastern potentate. His history

would be scarcely worth recording except for its connection with Greek history. His famous invasion was undertaken apparently for no other purpose than to gratify the vanity of a weak mind which was delighted with the idea of being able to assemble at one time 'ships by thousands' and 'men in nations,' who were at the mercy of his unprincipled caprice.

XIMENES (or JIMENES) DE CISNEROS, *zī-mē'nēz*, Sp. *che-mā'nēs dā thēs-nā'rōs*, FRANCISCO; in Spain commonly called DE CISNEROS: Spanish statesman, archbishop, and cardinal: 1436-1517, Nov. 8; b. Torrelaguna, in Castile; of humble family. He was educated at Alcalá de Henares, at Salamanca, and finally at Rome, where, having entered priest's orders, he obtained from the pope a provisional or prospective nomination to a prebend in the cathedral of Toledo. The archbishop, resisting the papal claim of 'provisor,' refused to admit X.; and on his persisting in his claim, put him in prison, where he was detained for a long time. On his release, he was named vicar-gen. of Cardinal Mendoza at Sigüenza; but he gave up this preferment, and entered the Franciscan order 1482. His reputation for piety and learning led the queen, Isabella, to choose him, 1492, for her confessor; and three years afterward to name him abp. of Toledo—a dignity which he refused until he received an express command from the pope. Having yielded in the end, he continued as abp. the life of mortification and austerity which he had practiced in his monastery; and he applied to purposes of religion, charity, and public utility the whole of the princely revenues of his see. As confessor and confidential adviser of the queen, X., during the lifetime of Isabella, was the guiding spirit of Spanish affairs; and on her death, 1504, he held the balance between the parties of Ferdinand and of Philip of Burgundy, husband of Joanna, heiress of the crown. On the death of Philip, 1506, X. was appointed regent, in consequence of the incapacity of Joanna and the absence of Ferdinand, and conducted the affairs of the kingdom through a critical time with consummate skill and success. In 1507 he was created cardinal; and in the following year he organized, at his own expense, and accompanied as commander, the celebrated expedition of 10,000 foot and 4,000 horse, for the conquest of Oran, on the African coast. Ferdinand died 1516, Jan., and on his death-bed named X. regent of Spain till the arrival of his grandson Charles; and though the grandees had organized an opposition as well to X. as to the royal authority, X., by his prompt and able dispositions, awed them into submission; and subsequently, by the same exercise of vigor and determination, quelled the incipient revolt of Navarre. In order to the better consolidation of the royal authority in Spain, X. urged very strongly the speedy visit of Charles, who still lingered in his Flemish principality; but it was not till after the lapse of a year and a half that the king decided on his journey; and meanwhile the enemies of X. had so worked on his jealousy and pride, that he took the ungracious and ungrateful course of dismissing his



## XIMENIA.

faithful, but, as he feared, too powerful servant. X., now more than 80 years of age, had set out to meet the king; and though laboring under great infirmities, continued his journey, when he was seized with a mortal illness at Branguillas, near Aranda de Duero, where he died.

As statesman and administrator, the reputation of Cardinal X. is deservedly of the very highest. The social and political revolution which he effected in breaking down the feudal power of the nobles has often been compared with the analogous change wrought in France by Richelieu. But the revolution of X. was, at least in its results, rather in the interest of the people than, like that of Cardinal Richelieu, of the crown; and while it freed the sovereign from the unworthy position of dependence on the nobility, it established the municipalities and the communal representatives in the possession of certain well-defined and substantial privileges and immunities. X., as an administrator of affairs, was bold, sternly inflexible, disregarding of private interests, either his own or others. The times were corrupt: the clergy were deeply immoral: but X.'s life was above reproach. His munificence as a patron of religion, of letters, and of art, has been the theme of praise in every history of his time. The University of Alcalá de Henares (q.v.), which he planned, organized, erected, and endowed, was a marvel of enlightened munificence in such an age, and may compare advantageously with even the most princely foundations of the most enlightened times. His Complutensian (q.v.) Polyglot, besides being the first of its class, was, considering the resources of the period, perhaps the grandest in conception among the projects of its own order; and the perseverance with which, during the fifteen years devoted to its preparation, he watched and directed its progress, evinces its origin from a genuine love of sacred learning, rather than from a passing impulse of literary enthusiasm. The cost of this gigantic undertaking amounted, on the whole, to 80,000 ducats. His expenditure on churches, hospitals, schools, convents, and other works of religion and benevolence, was on a scale of corresponding munificence. He maintained 30 poor persons daily at his own cost, and he regularly set apart one-half of his income to the uses of charity. —See Hefele's *Der Cardinal Ximenes und die kirchlichen Zustände Spaniens* (Tübingen 1851); Prescott's *Ferdinand and Isabella*.

XIMENIA, n. *zī-mē'nī-a* [named after Francis *Ximenes*, a Spanish monk, who wrote on Mexican plants, 1615]: genus of *Olacaceæ* with three or four known species. *Ximania Americana*, the false sandal-wood, is a straggling East Indian shrub, producing dull-white fragrant flowers, with odor like cloves; succeeded by small, oval, red or yellow pulpy fruits, an inch long, aromatic, but somewhat austere. They are eaten by the Hindus, and by the natives of Senegal. The kernels taste like filberts.

# XIPHISTERNUM—XYLOGRAPHY.

**XIPHISTERNUM**, n. *zǐf'ǐstér'nǔm* [Gr. *xiphos*, a sword; *sternon*, the breast]: in *zool.*, the inferior or posterior segment of the sternum, corresponding to the xiphoid cartilage of human anatomy.

**XIPHOID**, a. *zǐfoyd* [Gr. *xiphos*, a sword; *eidos*, resemblance]: in *anat.*, sword-shaped; ensiform; applied to the cartilage of the sternum.

**XIPHOPHYLLOUS**, a. *zǐ-fǒf'ǐl-lūs* [Gr. *xiphos*, a sword; *phyllon*, a leaf]: in *bot.*, having sword-shaped leaves.

^ **X RAYS**: see ROENTGEN RAYS.

**XYLANTHRAX**, n. *zī-lǎn'thrǎks* [Gr. *xulon*, wood; *anthrax*, coal]: wood-coal or charcoal, as distinguished from lithanthrax or mineral coal; a lignite or fossil wood.

**XYLEM**, n. *zī'lēm* [Gr. *xulon*, wood]: the woody portion of a vascular bundle, in contradistinction to the phloem or bast portion.

**XYLIA**, n. *zī'lǐ-a* [Gr. *xulon*, wood]: in *bot.*, genus of trees of the tribe *Eumimoseæ*, having sessile, sickle-shaped, compressed, woody legumes, with partitions between the seeds. *X. dolabriformis* (*Mimosa xylocarpa* of Roxburgh), the ironwood tree of Pegu and Arracan, yields a red resin, and oil is expressed from its seeds. The wood is very durable; it has been used in India and Burmah for railway ties, piles, beams of bridges, telegraph-poles, the handles of agricultural implements, boat-building, etc.

**XYLITE**, n. *zī'līt* [Gr. *xulon*, wood]: a peculiar liquid found in pyroxylic spirit; in *mineralogy*, a variety of amianthus having a wool-like texture, better known as *mountain-wood*, *rockwood*, etc.

**XYLO-**, *zī'lō* [Gr. *xulon*, wood]: prefix in compound words meaning *woody*, *of wood*, or *relating to wood*, as, *xylography*, wood-engraving.

**XYLOBALSAMUM**, n. *zī-lō-bǎl'sa-mŭm* [Gr. *xulon*, wood; *balsamon*, balsam]: the wood of the balsam-tree: a balsam obtained by decoction of the twigs and leaves of *Amyris gileadensis* in water: see BALSAM, or BALM OF GILEAD.

**XYLOCARP**, n. *zī'lō-kárp* [Gr. *xulon*, wood; *karpos*, fruit]: in *bot.*, a hard and woody fruit. **XY'LOCAR'POUS**, a. *-kár'pŭs*, bearing fruit which becomes hard and woody.

**XYLOCOPA**, n. *zī-lōk'ō-pa* [Gr. *xŭlokopos*, hewing or felling wood; *xulon*, wood; *kopē*, a cutting]: in *entom.*, a genus of solitary bees, with sharp-pointed mandibles by which they bore holes in timber; hence sometimes called carpenter-bees. In several species the females are black, the males a bright yellow. For *X. violacea*, see BEE.

**XYLOGRAPHY**, n. *zī-lōg'rǎ-fǐ* [Gr. *xulon*, wood; *graphō*, I write]: the act or art of cutting figures or designs in wood; wood-engraving. **XYLOG'RAPHER**, n. *-fēr*, one who engraves on wood. **XYLOGRAPHIC**, a. *zī'lō-grǎf'ik*, or **XY'LOGRAPH'ICAL**, a. *-ǐ-kǎl*, pertaining to xylography or wood-engraving; engraved on wood. **XY'LOGRAPH**, n. *-lō-grǎf*, an engraving on wood; a print or impression from such an engraving. See WOOD-ENGRAVING.



## XYLOID—XYRIS.

**XYLOID**, a. *zī'loyd* [Gr. *xulon*, wood; *eidos*, resemblance]: resembling or having the nature of wood; woody.

**XYLOIDIN**, n. *zī-loyd'in* [Gr. *xulon*, wood; *eidos*, resemblance]: explosive starch; a white inodorous and tasteless powder ( $C_6H_9NO_7$ ), insoluble in alcohol, ether, chloroform, benzene, water, etc., resulting from the action of strong nitric acid on starch or woody fibre. It is related to gun-cotton, and it explodes when struck, but with less violence than gun-cotton; it melts when heated; takes fire at  $356^\circ$  F., and burns brightly. By the action of reducing agents, it is again converted into starch.

**XYLOL**, n. *zī'lōl* [from *xyl(on)*, wood, and Latin *ol(eum)* oil]: dimethyl benzene,  $C_6H_4(CH_3)_2$ : a colorless, oily, aromatic fluid with strong refractive power, and boiling at about  $282^\circ$  F.; obtained from coal-naphtha and wood-spirit. Mixed with toluol, cumol, and cymol, X. was found among the oils separated from crude wood-spirit by addition of water, long before it was completely isolated; called also *Xylene*.

**XYLONITE**, n. *zī'lōn-īt* [Gr. *xulon*, wood]: a kind of compressed gun-cotton, resembling ivory, used in making combs and other articles; Celluloid (q.v.).

**XYLOPAL**, n. *zī'lō-pal* [prefix, *xylo-*, and *opal*]: in *mineral.*, same as wood-opal.

**XYLOPHAGA**, *zī-lōf'a-ga* [Gr., wood-eaters]: a family of *Coleoptera*, of section *Tetramera*, nearly resembling weevils, but differing from them in having no beak. They have short antennæ, thickened toward the tips, and sometimes leafy from the base. The species are numerous, and are arranged in many genera. They live mostly in wood, on which they feed, both in their perfect and larval states. Some are very destructive to trees and timber. See BARK BEETLE: SCOLYTUS. Some of the X. live in fungi, and feed on them.

**XYLOPHAGI**, n. plu. *zī-lōf'ă-jī* [Gr. *xulon*, wood; *phagein*, to eat]: wood-eaters. **XYLOPH'AGANS**, n. plu. *-gănz*, insects whose larvæ devour the wood of the trees in which they are hatched. **XYLOPH'AGOUS**, a. *-gŭs*, eating or feeding on wood.

**XYLOPHILAN**, n. *zī-lōf'ĭ-lăn* [Gr. *xulon*, wood; *philēō*, I love]: a beetle that lives on decayed wood.

**XYLOPHONE**, n. *zī'lō-fōn* or *zīl ō-fōn* [Gr. *xulon*, wood; *phonē*, voice, sound]: musical instrument consisting of a series of graduated bars of wood, sometimes supported on bands of straw (hence sometimes called 'straw-fiddle'), and played with small hammers. The xylophone has been used to test the vibrative properties of the different kinds of wood and of the different metals.

**XYLORETINE**, n. *zī'lō-rē'tin* [Gr. *xulon*, wood; *rhētīnē*, resin]: a sub-fossil resinous substance, found in connection with the pine-trunks of certain peat-mosses.

**XY'RIS**: see YELLOW-EYED GRASS.

## XYST—XYSTHRUS

XYST, n. *zíst*, or XYST'OS, n. -*ōs*, or XYSR'US, -*ūs* [*L. xystus*—from Gr *xustos*, a covered portico with a polished floor—from *xuō*, I scrape]: in *anc. arch.*, a sort of covered portico or open court, of great length in proportion to the width, in which the athletes performed their exercises.

XYSTARARCH, n. *zís'tárk* [Gr. *xustos*; *archō*, I rule]: in *Gr. antiq.*, an Athenian officer who presided over the gymnastic exercises of the Xyst (q.v.).

XYSTER, n. *zís'tér* [Gr.—from *xuō*, I rub, I scrape]: in *surg.*, an instrument for scraping bones.

XY'SYTHRUS: tenth king of Babylon, and the Babylonian Noah of the Deluge, according to the Chaldean historian Berosus, portions of whose work survive in Eusebius. The account agrees with that of Genesis in respect to a prophetic warning, a ship built, its resting on a mountain (in this tradition in Koordistan), and the erection of an altar for sacrifice; but the King X., after the sacrifice, disappeared among clouds. Berosus speaks of the ship as still existing, and of people taking away asphaltum from it as a charm; and this is spoken of also by Abydenus, who found an account of the Deluge in the archives of the Medes and Babylonians, and who calls the king Seisithrus. According to Abydenus, birds were liberated from the ship and came back with mud on their feet. The cuneiform inscriptions, found and translated of late years, give substantially the same traditions. Berosus says that those who were saved in the ship returned and rebuilt Babylon, which had a succession of 86 kings before the conquest by the Medes.



# Y

Y, y, *wi*: 25th letter, and last but one, of the English alphabet; derived from the Greek  $\Upsilon$  ( $\nu$ ). It had no place in the earlier Latin alphabet, and came into use by Roman writers in the time of Cicero in spelling words borrowed from the Greek. In the Greek of the classical age,  $\nu$  ( $\Upsilon$ ) no longer retained its pristine power (It. *u* or Eng. *oo*), but had degenerated into a sound like the French *u*, or even nearer to the French *i* (*ee*); it could not, therefore, be represented by the Roman *u* or *v*, which had remained (and still remains in modern Italian) undegenerated; thus it became appended to the Roman alphabet as a new character. Its use in native Latin words, as *sylva* for *silva*, *satyra* for *satira*, is an error of modern editors. Italian has no *y*, but uses *i* instead, as *sinfonia*, symphony. The other modern languages of Europe have retained it in spelling words of Greek origin, and some of them substitute it for *i* in native words, generally in a very capricious manner. German orthography has recently been purged of this abuse; and in Dutch, where it had always the sound of English *i* (*ai*), the double character *ij* is now written. In English, in addition to its value as a vowel (equivalent to *i*), *y* is used to represent the semi-consonantal power of *i* or *j* (see I and J) in the beginning of a word and before another vowel, as *yoke* = Lat. *iugum* or *jugum* = AS. *iuc*; *young* = AS. *iong* = Ger. *jung*. It has been suggested that the practice of writing *y* at the end of a word instead of *i*, while we replace it by *i* on adding a syllable (e.g., *lovely*, *lovelier*), may have arisen, like the habit of giving a tail to the last unit of the Roman numerals (e.g., *ij*, *iiij*), in the wish to give a kind of finish to the word and please the eye. The would-be antique spelling *y<sup>e</sup>*, *y<sup>t</sup>*, for *the*, *that*, is a blunder, arising from mistaking the AS. *þ* (= *th*) for a *y*. As a mediæval Roman numeral, *Y* stood for 150, and with a horizontal stroke over it ( $\bar{Y}$ ) for 150,000. In chem., *Y* is the symbol used for *Yttrium*, and is in algebra the second of the variables or unknown quantities.

Y- [AS. *ge-*, an extremely common prefix, both of verbs and nouns]: a prefix sometimes written *i*, *e*, and *a*, used in Middle English, without, however, increasing or modifying the meaning of the word; it has the sound of *ē*, as in YCLAD, *ē-klād'*, clad. YCLEPT, *ē-klēpt'*, called. YDRAD, *ē-drād'*, dreaded.

## Y—YACHT.

Y, *wî*: something shaped like the letter y; one of the forked pieces which support the pivots of the telescope of a theodolite, or the like; a two-way pipe or coupling; a switch-connection on a railway, used instead of a turn-table for reversing the direction of a locomotive, train of cars, or the like. It consists of a short track at right angles to the main track, and connected with it by two curved arms (which with the short track form the letter Y). A locomotive or train switched head on by one of these arms to the short track and then backed by the other arm to the main track will head in the opposite direction when it arrives there.

YABLONOI MOUNTAINS, *yâ-blō-noy'*: range in n.e. Asia, dividing the basin of the Amur from that of the Lena. Some peaks are between 7,000 and 8,000 ft. high, but parts of the ridge are but a kind of plateau. The Stanovoi Mts. (q.v.) are a continuation of the Yablonoi Mountains.

YAC'ARE: see JACARE: ALLIGATOR.

YACCA-WOOD, n. *yăk'kă*:- the timber of *Podocarpus coriaccēa*, much used in the West Indies for cabinet-work.

YACHT, n. *yôt* [Dut. *jagt*, a light ship fit to give chase with—from *jagten*, to chase, to hurry: Ger. *jähe*, quick]: a light and fast-sailing vessel, used for pleasure-trips, racing, and the like: V. to sail in a yacht. YACHT'ER, n. *-ēr*, one sailing a yacht. YACHT'ING, n. pleasure-sailing in a yacht: ADJ. relating to yachts and their use. YACHTSMAN, n. *yôts'măn*, one who sails or cruises in a yacht.

YACHT: vessel, usually not of great size, constructed to combine strength, elegance, and speed; and employed exclusively for pleasure-sailing. Taking the term yacht in its most extended sense, as a pleasure-vessel, the sport of yachting will be found to go back to early times. The galleys of Tyre, with ivory benches and embroidered sails of linen, and blue and purple colors, are spoken of by the prophet Ezekiel. Caligula's yacht is described as built of cedar, with jewelled stern and inlaid decks. Cleopatra's galley also may claim recognition among the yachts of classic times. In England in the Anglo-Saxon era we hear of the king of Norway presenting Athelstan with a magnificent royal vessel with purple sails, and with the head and deck wrought with gold. Queen Elizabeth had her royal barge, and in 1588 a pleasure-ship was built at Cowes, thus carrying back the association of yachting with that port more than three centuries. In 1604 a yacht was built by the king's master-shipwright for Henry, eldest son of James I. of England—the idea as well as the name of such a vessel being taken from the Dutch. In 1660 Charles II. of England was presented by the Dutch with a yacht named *Mary*. The same king designed a 25-ton yacht himself, which was built at Lambeth 1662: this he named the *Jamie*. In the same year the *Jamie* sailed against a Dutch yacht for a prize of £100. The king was on the *Jamie*, and is said to have steered part of the course, which was from Greenwich to Gravesend, but was beaten by his competitor, which was under command of the Duke of



## YACHT.

York. From this time, yachting, steadily patronized by royalty, became a favorite pastime of the nobility and gentry. This amusement is encouraged by government, mainly because it supplies an excellent training for seamen, who in time of war become available for the navy, while in time of peace they are no burden on the national treasury: accordingly, yachts are allowed to bear the ensign of the royal navy, supplemented by the special flag granted by the admiralty to each club, and to refit and revictual in the royal dock-yards.

In Maitland's *History of London* (1739), sailing and rowing on the Thames are mentioned; and Strutt, in his *Sports and Pastimes* (1801), speaks of the Cumberland Soc., who were addicted to yachting, and who annually gave a silver cup to be sailed for near London. The usual course was from Blackfriars to Putney, and return to Vauxhall. The competing boats were of small size. In 1720 the Cork Harbor Water Soc. was founded, whose name has since been changed to the Royal Cork Yacht Club. This is the first authentic record of a yacht club in the United Kingdom: in its early days it included only some small boats. During the 18th c. the sport developed very slowly, though matches were sailed at Cowes as far back as 1780. In 1812 the 'Royal Yacht Squadron' was established by about 50 yacht-owners at Cowes, Isle of Wight (the second club in order of seniority), and was called the Yacht Club; its name was changed 1820 to the 'Royal Yacht Club.' In 1880 there were about 50 yacht clubs in the United Kingdom, possessing, according to the *Yacht List* (1880), about 3,700 yachts. The club which stands first as to the number of its members and yachts is the Royal Thames Yacht Club, founded 1823, with headquarters in London. Of the other clubs, 6 are Scotch (4 on the Clyde and 2 on the Forth), 8 Irish (2 at Queenstown, 2 at Kingstown, 1 at Dublin, 1 at Belfast, 1 at Carlingford Loch, and 1 at Loch Erne), and the rest English, located mostly on the Thames, the channels between Southampton and the Isle of Wight, or the n. coast of Wales, from Liverpool to Holyhead. More than half of these clubs have been founded since 1840.

The principles adopted in the construction of yachts have fluctuated greatly. The yacht of the early part of the 19th c. was built with a fine run aft and a bluff bow; but this style was supplanted by increased sharpness of bows and stern, a raking (slanting upward and backward) stern-post, more depth, the draught aft double of that forward, great fineness of the water-lines, narrow beam, and immense sails. The effect of these changes was great increase of speed, attended, however, with certain defects: one of which was that the diminished breadth of beam injuriously affected buoyancy, and the yachts consequently were more liable to be wetted in a heavy sea. In 1851 the manner in which the crack yachts of the principal clubs in England were beaten by the yacht *America*, of the New York Yachting Club (see below), showed their owners and builders that they had still much to learn in the way of improvement. The *America* had great breadth of beam, comparatively lit-

the depth inside, an upright stern-post, extremely sharp entrance, and fine water-lines, and (the most remarkable feature) her maximum breadth considerably abaft the centre. Except the great breadth of beam and little depth inside, all the other characteristic points of the American yacht were adopted by the British builders; the difference between the draught aft and forward was diminished; and the result has shown that these changes were great improvements.

About 1844 the New York Yacht Club was founded, the first American organization of the kind, with nine members and nine yachts; a year later 17 yachts and 171 members were enrolled; and 1845, July 17, the first regatta in the United States was held, down the Bay of New York, around the light-ship, and return. Seven sloops and three schooners took part in it, and the *Cygnets* was the winner. The next year marks the first match-race recorded in the United States, 1846, Oct. 10, between the sloop *Black Maria*, 154 tons, owned by John C. Stevens, and the schooner *Coquette*, 74 tons, owned by J. H. Perkins, for a stake of \$500 a side. The course was 25 m. to windward and return, off Sandy Hook light-house. The *Black Maria*, which was of the shallow type, with enormous sail area and two centreboards, and every refinement to secure speed, was beaten by the *Coquette*. This sloop's strong point was smooth-water sailing, and she proved lacking in speed in a sea-way.

The English yachts were built originally on the principle in vogue with the revenue-cutters of the day—full forward with fine run aft. Their sails were set loose on the foot, so as to bag—the idea being that better speed was thus secured. The *Black Maria* was regarded as a wonder by those who inspected her, and was the opposite in all respects of the deep-draught English keel-boats—being 100 ft. long and only 5 ft. 3 in. draught. Her sails were set as flat as possible. The 'cod's head and mackerel's tail' type of hull was criticised unfavorably by J. Scott Russell (q.v.), of London, as early as 1848; and in that year a yacht was built by Mare at Blackwall with hollow lines forward and full stern: this boat was the iron cutter *Mosquito*, 59 ft. 2 in. long on the water-line, 15 ft. 3 in. beam, and rating at 50 tons. The principle did not find favor. In 1851 the American yacht *America*, built by George Steers of New York, noted as a builder of pilot-boats, crossed the Atlantic. A special regatta without time-allowance was arranged for the stranger, the course being around the Isle of Wight, 15 yachts competing besides the *America*. The *America* came in 18 minutes ahead. The English are chary of giving full credit for the victory, alleging that three of her most dangerous competitors were disabled. As regards time-allowance, it is conceded that if she had given it she would still have won by 2 minutes. The cup called the America's Cup was awarded, and is still held in this country by the New York Yacht Club, subject to challenge from other nations. A number of contests have been sailed for it by English yachts (*Cambria* 1870,



## YACHT.

*Livonia* 1871, and others), but without avail: for some of these contests, see CUTTER.

Among remarkable records may be mentioned the following: In 1870 the English yacht *Cambria* and the American yacht *Dauntless* sailed a match-race from Daunt's Rock, near Queenstown, to Sandy Hook, 2,861 miles. The *Cambria* beat the *Dauntless* one hour—an unprecedentedly close contest for the distance. The schooner-yacht *Magic*, of New York, 1870, Aug. 8, in one of the races for the America's Cup, sailed over a 43-mile course, in and outside of the Bay of New York, in 4 h. 7 min. 54 s., starting from an anchorage. In 1873, June 6, the American schooner-yacht *Madelaine* sailed over most of the same course, about 40 m., in 4 h. 1 min. 20 s. For a day's run on the ocean the American yacht *Sappho* is credited with a run of 318 m. in 24 hours under reefed canvas, 1872, Apr. 28. The same yacht had sailed from New York to Queenstown (1869) in 12 days 9 h. 34 min. 50 s. The *Dauntless* sailed about 225 m., 1875, Oct. 28-29, in 18 h. 30 min.

In 1871, '76-'81, '85, '86, '87, '93, '95, '99, 1901, and '03 the English sought without avail to regain the America's cup. In 1893 the contest was spiritedly renewed. The *Valkyrie*, owned by Lord Dunraven, and built expressly for such a trial, was chosen out of several yachts to represent Great Britain, and the *Vigilant*, owned by an American syndicate, was named to represent America. The first race was started Oct. 5, off Sandy Hook, outside of New York harbor, but as the contestants failed to finish the course within the prescribed limit of 6 hours, the race was declared off. The next race took place Oct. 7, the *Vigilant* beating by 7 m. 36 s., the time being reduced by the time-allowance granted to the *Valkyrie*, of 1 min. 48 s. On Oct. 9 the *Vigilant* was again successful, by 12 min. 25 s., the same time-allowance being deducted. The third race was declared off on account of very light winds. The fourth race (counting as the third) took place Oct. 13, when the *Vigilant* won by 40 s., or, making time-allowance, 13 s. The *Valkyrie* was afterward sunk off Cowes, England, in a collision, and so could not meet in her home waters the *Vigilant*, which crossed the ocean for that purpose; but other English yachts, notably the *Britannia* and *Ailsa*, raced the *Vigilant* and defeated her in a majority of the races, the American boat encountering many local difficulties which she had not been accustomed to, finally losing her centreboard in contact with a rocky bottom. After the *Valkyrie's* defeat in 1893, Lord Dunraven sent a challenge to the New York Yacht Club for a contest in 1895, which was accepted. A new yacht built in America, the *Defender*, met Lord Dunraven's new yacht, *Valkyrie III.*, Sept. 7, off Sandy Hook, the sail to be 15 m. to windward and return. In the first half (windward) of the race the American yacht outsailed her British competitor by nearly  $3\frac{1}{2}$  min., and on the return by 5 min., time-allowance being made. It was estimated that *Valkyrie III.* carried 600 sq. ft. of canvas more than the *Defender*. The second race was sailed Sept. 10. Just before the yachts reached the start-

## YACHT.

ing-line, while manœuvring for position, *Valkyrie III.* bore down on *Defender*, and by the swing of the English yacht's boom a foul was caused; the *Defender's* spreader was carried away and her topmast sprung. The American yacht hoisted a flag of protest, and the contestants proceeded to sail the race, the course being a triangle of 10 miles to the leg and the first third to windward. In the sail to windward *Valkyrie III.* gained; but on the reaches forming the second and third sides of the course she was outfooted by the *Defender*, and when the English yacht crossed the line she was winner by only 47 s., corrected time. The day after the second race the regatta committee awarded the race to *Defender*. Lord Dunraven then withdrew from the contest, and on Sep. 12, the *Defender* sailed the course alone. After his return to England Dunraven published a pamphlet in which he made charges of unfairness against the owners and crew of the *Defender*, which the New York Yacht Club investigated and found untrue. In 1898 Sir Thomas Lipton challenged with *Shamrock I.*; in 1901 with *Shamrock II.*; and in 1903 with *Shamrock III.* In each contest the American defenders won, the *Columbia* in the two first and the *Reliance* in the third.

The Schooner (q.v.), a fore-and-aft rigged two-masted vessel, has long been a favorite type of yacht, especially in this country. In England one-masted cutters and two-masted yawls have rather been favorites. The Yawl (q.v.) has one large mast forward of amidships, and a smaller mast on her extreme stern. Within a few years, as the racing feature has become more pronounced, the sloop rig has become more in vogue here for racing yachts (see SLOOP). The tonnage is very variable—perhaps an average is 30–50 tons. Some sloops have been of large dimensions, but the recent tendency is to race with smaller vessels; and classes based on nominal length have been established in this country, such as 46-footers, 30-footers, and the like. In England the rating into classes is based on tonnage, as a five-tonner or ten-tonner.

The American yacht has been of either keel or centre-board build: the latter type is best adapted for shallow water, as the centreboard can be raised on an emergency, thus greatly diminishing the draught. Its structure is simple. An open trunk or box is built, within the hull, and resting upon or at one side of the keel. It is long and very narrow (a few inches in width), and is open to the water below. Within it is a large 'board,' made of planks bolted together, and the whole pivoted at its forward end so as to swing up or down. A rope or iron rod (the centreboard pendant) is attached to its top at the after end, with which it is raised. Its own weight carries it down when the pendant is released. Sometimes rack-and-pinion motion is employed to raise it. In small boats the board sometimes slides up and down bodily, and other variations are in use for canoes and the like. Recent modifications of this type involve the weighting of the centreboard, so as to have it act as ballast. Sometimes it is made entirely of metal, and when lowered adds immensely to the stability



## YACHT.

of the boat. When running free, the centreboard is partly or completely raised, thus reducing resistance. When sailing close-hauled, the board is fully lowered.

The keel type of yacht found its exponent in America in broad shallow vessels with deep keel, and it is within a comparatively recent period that deep narrow boats of the cutter type have been used. Several important changes have been introduced. Lead ballast, internal or external, had been used for some time in both centreboard and keel boats. The external ballast was bolted or otherwise secured to the keel of the boat outside so as to be as low as possible. The keel-boats now took a hint from the centreboards and affixed what is virtually a fixed centreboard below the keel, extending far down into the water. This is called a 'fin-keel,' and the same name is applied to the boat provided with it. A mass of lead, in a general sense cigar-shape, was secured to the bottom of the keel, projecting therefrom on both sides: this constitutes a bulb-keel. Generally 'Bulbs' are attached also to the bottom of the fins. These are the three most recent types.

The English adhere to the type of narrow deep hull without centreboard. They still set their sails more baggy than the Americans, but in general use about the same sails. They conduct racing on a most expensive scale, an 80 or 100 ton cutter costing £2,000 to £3,000 per annum for racing. The most successful boat may win £1,000 in the season. Although the English yachts have never succeeded in recovering the America's Cup, they claim very high records, such as 50 nautical miles in 4 h. 7 min. by the *Irex* 1885.

The American yacht fleet numbers over 1,200 yachts, including steam-yachts. Steam-yachts have now attained an important place, and may soon be the more favorite class. They include a very varied class of vessel, some ranking with ocean steamers in accommodations and equipment, if not in size; but the smaller type, termed launches, are gradually growing in favor. Compound engines are generally used. As regards records, the *Atalanta*, a large ocean-going steam-yacht, is credited with running on Long Island Sound about 90 m., Larchmont, N. Y., to New London, Conn., 1886, July 15, in 4 h. 34 min. 57 s. The steam-launch *Norwood* is credited with a mile run in 2 min. 12½ s. (with the tide), 1891, Nov. 7; and with about 12 m. in 32 min. 1891, Aug. 18. The steam-launch *Vamoose* is credited (1891, Oct.) with 4 miles as follows: 2 min. 50 s., 2 min. 30 s., 2 min. 30 s., 2 min. 35 s.

Naphtha-launches have been introduced in considerable number. These are driven by an engine actuated by naphtha vapor, the fire being supplied by the same. They need little attention or skill, and have gained much popularity. Electric launches driven by storage batteries have been used on the Thames, England, where stations are convenient for charging the batteries.

The materials used in the building of yachts are wood, iron, and steel; wood alone, wood and iron together, iron alone, and steel alone, being the various ways in which the

## YADKIN—YAJURVEDA.

materials are employed. Yachts of wood, or of wood and iron, are generally coppered, to protect the planking and secure the smoothness of surface essential to speed. For the considerations which determine the relative length, breadth, depth, etc., see SHIP-BUILDING. Stimulus is given to improvements in construction by the numerous prizes offered for competition by the various yacht clubs. These small but powerfully built and thoroughly seaworthy vessels have traversed every sea; and one or two have circumnavigated the globe. Some of the most remarkable of the long voyages by yachts (besides the race of the *Cambria* and the *Dauntless* above noted) are the voyage from New York to Liverpool of the *Charter Oak*, 23 tons, in 36 days; that of the *Sylvie*, 205 tons, from Halifax to Havre, in 16½ days; those of the *Inca*, *Katinka*, and *Vivid*, 25 tons each, from England to Australia; and the great Atlantic yacht-race from New York to Cowes, 1866, Dec., which was won by the *Henrietta*, 205 tons, after a voyage of 14 days.

YAD'KIN RIVER: upper course of the GREAT PEDEE RIVER (q.v.).

YAGER, n. *yâ'gér* [Ger. *jäger*, a hunter]: in *Prussia*, a rifleman; in *Austria*, a mountaineer belonging to a body of light infantry; a hunter.

YAHOO, n. *yâ-hô'* [a name used by Swift in *Gulliver's Travels*]: a savage or one like a savage; one of a race of brutes having the form of men.

YÂJNAVALKYA: reputed author of the S'atapatha-Brâhman'a (see VEDA—*Yajurveda*), and of a Dharmas'âstra, or law-book (see SANSKRIT LITERATURE—*Law*). His name points to his descent from Yajnavalka; and tradition makes him a descendant also of *Vis'wâmitra* (q.v.), belonging to a branch of the *Kus'ikas*. He seems to have had high position at the court of King Janaka of Videha, but nothing is known regarding the age in which he lived.

YAJURVEDA, n. *yâj'ér-vē'da* [Skr. *yaj*, to sacrifice]: in *Hind. sacred literature*, the third portion of the Veda, generally called the third Veda. It consists not merely of verses from the Rigveda, but also of prose sentences used at the offering of certain sacrifices. There are two editions, called the Black and the White Yajur: see VEDA.



## YAK.

**YAK**, *yāk* (*Bos grunniens*): species of ox domesticated in Tibet; ranked by Col. Hamilton Smith in the genus *Bison*, with the Bison, Gaur, and Gayal; and ranked by Gray in the new genus *Poëphagus*. The wild yak of central Asia is the largest native animal of Tibet, and is found only near the limits of perpetual snow, descending into the higher wooded valleys in winter, and ascending in summer to the pastures of short grass and *carices*, some of which are 17,000 ft. above sea-level. It is hunted by large dogs, and is very fierce, falling on an adversary not only with its horns but with its chest, and crushing him by its weight. It is generally black. The yak has been domesticated from time immemorial, and forms great part of the wealth of the inhabitants of the highest and coldest regions of central Asia. The domesticated yak is about the height of an ox, which it much resembles also in figure of body, head, and legs; but it is covered all over with a thick coat of long silky hair, hanging down like the fleece of a sheep. The head is rather short; eyes are large and beautiful; horns not very large, spreading, tapering from the base, a little turned back at the tips, a space between them on the forehead covered with a mass of curling hair; the nose is smooth and convex, with small nostrils. The neck is short; the withers are high and arched; the rump is low; the legs are short. Over the shoulders there appears a bunch somewhat like that of the zebu, but consisting only of long hair. The hair of the whole ridge of the back is long and erect, but not harsh. The tail is covered with a prodigious quantity of long flowing hair, descending to the hock, and



Yak (*Bos grunniens*).

has much the appearance of a large bunch of hair artificially attached. Not a joint of it is visible. From the chest, between the fore-legs, issues a large pointed tuft of long hair. The hair of the shoulders, rump, and upper parts of the body is comparatively thick and short; but that of the lower parts is long and straight, hanging below the knee, sometimes even to the ground. Yaks have great variety of colors; but black and white are prevalent. Often the long hair on the ridge of the back, the tail, the tuft on the chest, and the legs below the knee, is white

while all the rest is jet black. The great quantity of hair, evidently a protection against the cold of the climate in which it lives, gives the yak an apparent size far beyond the reality.

It delights in steep and rocky places. Hooker, in his *Himalayan Journal*, describes the calves as 'the drollest of animals, like ass-colts in their antics, kicking up their short hind-legs, whisking their bushy tails in the air, rushing up and down the grassy slopes, and climbing like cats to the top of the rocks.' The yak is capable of becoming very tame. The milk of the yak is very rich, and the curd made of it is much used by the Tibetans, both fresh and dried, often powdered into a kind of meal. The butter from yak-milk is excellent, and is preserved in bladders for a long time in the dry and cold climate of Tibet: it is an important article of Tibetan commerce. The flesh is of the finest quality; that of the calves is much superior to ordinary veal. Yak flesh is often dried in the sun by the Tibetans, and eaten raw. The yak is never used for tillage or draught, but is much employed as a beast of burden, and travels at a slow pace 20 m. a day, where no other beast of burden could well be employed. The lazy and luxurious lamas of Tibet often ride on it, an attendant leading the animal. The hair is spun into ropes, and made into coverings for tents. The soft fur on the hump and shoulders is made into a fine and strong cloth. Caps, jackets, cloaks, and blankets are made of the skin with the hair on. The tails are the *chowries*, or fly-flappers, used in all parts of India, particularly on all occasions of state and parade, seen in the hands sometimes of menials, sometimes of the highest officers of state.

It is thought that the yak would repay more attention than it has received. It is still confined to its native region, whereas it is probably adapted to increase the productiveness and wealth of many parts of the world, especially of northern countries. Its hair is probably fit for other textile purposes than those to which it has been applied by the rude Tibetans.

YAKSHA, *yāk'shā*: in later Hindu mythology, one of a class of demigods, who especially attend on Kuvera, the god of riches, and are employed in the care of his garden and treasures. According to the Vishn'u-Purân'a, they were produced by the god Brahman, as beings emaciated with hunger, of hideous aspect, and with long beards; but Brahmanic poetry generally represents them as inoffensive. Buddhists on the contrary, describe them in some of their legends as cruel demons, who feast on serpents and human corpses, and when filled with this loathsome food, indulge in fierce combats; but in other legends, as beings who delight also in dances, songs, and amusements, and sometimes even enter the paths that lead to *Nirvân'a*. In Buddhist legends they have also the power of raising storms, and are far more prominent than in the Brahmanic pantheon. The Yakshas of the Brahmanic mythology have wives, Yakshis, who sometimes appear in the train of Umâ (q.v.).



YAKUTSK': see JAKUTSK.

YALE, *yāl*, ELIHU: 1649, Apr. 5—1721, July 8; b. in or near Boston. His father, who had come to New Haven 1638, returned to England while his son was a child, and Y. never afterward visited America. About 1678 he went to the E. Indies, and was gov. of Fort St. George, Madras, 1687–92. He acquired wealth, returned to England, made the first auction known there, became gov. of the E. India Co., and was made a fellow of the Royal Soc. Between 1714 and 1721 he gave to the Collegiate School of Connecticut books and money valued at £500; and when its new building was opened at New Haven 1718, the trustees named it Yale College, and by the charter of 1745 this name was formally given to the institution. Y. was buried at Wrexham, Wales.

YALE, LINUS: inventor: 1821, Apr. 4—1868, Dec. 24; b. Salisbury, N. Y. For a time he was a portrait-painter. In 1850 he devised a key for bankers' safes, and thenceforward gave his time to mechanical inventions; and his investigations led to the adoption of the dial and shaft of combination locks, the perfecting of the clock lock mechanism, and the invention of the double lock. He patented devices for adjusting the joiners' square at a right angle, for reversing the motion of screw-taps, and for improvements in mechanics' vises, and introduced valuable improvements in post-office locks and boxes. He received first awards for his exhibits at world's fairs in this and in other countries. He died in New York.

# YALE UNIVERSITY.

YALE UNIVERSITY: at New Haven, Conn.; third origin (1701) as a col. in Amer., after Harvard (1638) and William and Mary, Va. (1694); Yale had (1902-3) 2,785 students and 301 teachers. In the post-graduate dept. were 307 students. 30 of whom were women. In the Col. proper—students: senior class 313, junior 260, sophomore 281, freshmen 351—total 1,205; in the Law School 213 students; in the Medical School 133; in the Divinity School 87; in the Sheffield Scientific School 738. Yale has a special art schl., the Street Art Schl., building which cost \$220,000, and \$75,000 endowment; students 29. The dept. of Music has 47 students. The libraries contain **The dept. of Music has 76 students.** The libraries contain more than 240,000 vols.; library accessions about 5,000 vols. annually. One wing of a projected museum has been built, at a cost of \$175,000. The zoological and mineralogical collections are notable. Yale has had the Sloane Physical Laboratory since 1882-3; the Kent Chemical since 1887, costing \$75,000; and has at the Sheffield Scientific School important facilities, provided from the Fayerweather bequest 1891. The latest reported receipts for the univ. for a year (1901) are \$900,000, including gifts and income from funds.

The institution was founded at Saybrook, Conn., as 'a collegiate school,' 1701, Sep.—Nov., by the Rev. James Pierrepont (q.v.), minister of New Haven, the Rev. Abraham Pierson (1641-1707—q.v.), of Killingworth, and eight other Congl. ministers in Conn., to secure 'a learned and orthodox ministry,' by instruction in 'arts and sciences' suited to fit for 'employment both in church and state.' The institution had a struggling existence at Saybrook until 1716; when removal to New Haven was undertaken, and a college building was provided on the s.e. corner (1¼ acres) of the present campus—a structure of wood, 170 x 22 ft., with three stories, 22 sets of rooms, a large dining-hall, used also as a chapel, and a library. This ancient college, completed and opened 1718, Oct. 8, was in use until the winter of 1775-6, and its dining-hall and kitchen until 1782. Toward the cost of this first college the Rev. Cotton Mather secured a cargo of gifts from Elihu Yale (q.v.) of London, on a suggestion that 'what is forming at New Haven might wear the name of Yale College.' The donor, who had become very rich as gov. in Madras, India, was of Boston birth; and his father, David Yale, had been a colonist at New Haven, and step-son of Gov. Eaton. A second gift from Gov. Yale met part of the cost (one-fifth) of the second building, a house for the rector in College st., a little s. of the campus.

The first rector, 1701, Nov.—1707, Mar. 5, was the Rev. Abraham Pierson (1641-1707—q.v.), who stood next to Pierrepont and Yale among the founders. The Rev. Samuel Andrew, minister of Milford, was the second rector, 1707-18, but the work of teaching was left to one or two tutors, until the Rev. Timothy Cutler, D.D. (q.v.), was given active charge as third rector, 1719, Mar.—1722, Sep.; and on his declaring for the divine right of episcopacy, his discharge from further service was followed by the election as fourth rector, 1726-39, of the Rev. Elisha Williams



(q.v.), under whom, 1737, originated the plan of a committee, the 'prudential committee' of nearly a hundred years past, serving as the working body of the corporation. The notable gifts of the celebrated Bp. Berkeley date from 1731-33, about 900 vols. of books and an estate near Newport, unfortunately leased in 1763 for 999 years at \$55 a year.

The fifth rector, 1739, Oct.—1766, Sep. was the Rev. Thomas Clap (q.v.), under whom a new charter was secured, 1745, which designated the corporation as 'The President and Fellows of Yale College in New Haven,' and provided for organization, powers, and administration as in 'colleges or universities,' with a view to 'the promoting all good literature in the present and succeeding generations.' A proficient in mathematics and natural philosophy, ardently opposed to 'new light' revival movements, and wisely zealous for the independence of the college, Pres. Clap did much to broaden the course of study, to secure increased state or colony aid, to have regular professors, not merely tutors, and to multiply buildings. The colony grant 1745-55 was 'one hundred pounds silver money, at the rate of 6s. 8d. per ounce.'

The first brick college, old 'South Middle,' was built 1750-52, at a cost of £1,660 sterling, mostly colony funds. The first professorship, that of divinity, was provided for 1746, and filled 1755, the college having meanwhile separated from the First Church in New Haven, under an alarm of heresy there, as well as because of dull preaching. A college church was organized 1757; a divinity professor's house was built 1757-8, in York st., now the Medical College site; a brick chapel and library building (later the Athenæum) was undertaken 1761, and stringent measures adopted to bind the college to orthodoxy. Public criticism and alienation of colony support from 1755, with an effort, 1763, to have the legislature take in hand the affairs of the college, also some disorder among the students, had seriously crippled the institution, when the divinity prof. Naphtali Daggett, D.D. (q.v.), was put in charge, 1766, Oct.—1777, Mar., as pres. *pro tem*. The depression of this period was modified by the work of such able tutors as Joseph Howe, John Trumbull, Timothy Dwight (later president), and Joseph Buckminster, whose zeal for learning and fresh thought made a beginning of liberal development. Other notes of progress were the founding of a second professorship (math. and nat. philos.); the class-listing of students alphabetically instead of, as before, according to supposed family standing; and a new literary society 1768, more democratic (Brothers in Unity) than the earlier Linonia 1753.

The next president, Ezra Stiles, D.D., LL.D. (q.v.), 1777-95, was an ardent scholar, more than 20 years a pastor at Newport, R. I., notably free from orthodox rigidity, fervently patriotic through the revolution, and most devoted to the college, which he found practically broken up by the outbreak of the revolution. The roll showed in 1777 132 students. in 1787. 139. The labors of Dr. Stiles em-

braced mental and moral philosophy, church history, mathematics and natural philosophy, and divinity. A professorship of Hebrew and other oriental languages was provided for 1781. A new brick building, 1782, provided a common dining-hall and kitchen, until taken later, 1820, for a chemical laboratory. Under a plan of James Hillhouse, LL.D. (q.v.), college treasurer (to 1832), the gov., lieut.gov., and six senior state senators became members of the corporation, from 1792, June, to secure a grant from the state and satisfy the anti-clerical demand for state oversight. A new dormitory, South College, 1793-4, was one of the results. A departure effected by Dr. Stiles was the discarding of the elaborate theological tests exacted by the corporation of ministers at his accession, and the requiring only a simple general assent to the 'Saybrook Platform.' This broader tendency was notably represented in the next pres., 1795-1817, Jan., the Rev. Timothy Dwight, D.D., LL.D. (1752-1817—q.v.), an educator and preacher among the best in New England history, of most impressive personality, a stimulating teacher, and of remarkable oratorical power. The college thus far had been ruled by the pres. as autocrat; and upper-class tyranny over lower, borrowed from English university custom, was in vogue. Dr. Dwight created govt. by the faculty—pres., profs., and tutors in council. From 1804 he secured class equality, and made all college relations those of courtesy and social freedom. He added the duties of divinity prof. and college preacher to those of pres., and was one of the most effective and influential religious teachers in American history. A dept. of rhetoric and Eng. literature dates from his work. In 1801 he brought Jeremiah Day into the chair of mathematics; secured a new chair of chemistry, mineralogy, and geology 1802, with Benjamin Silliman (1779-1864—q.v.) as incumbent; and another chair of anc. languages (Heb., Gr., and L.) and church history, which James L. Kingsley filled from 1805. A professorship of law, also, was instituted 1801, prophetic of the Law School more expressly aimed at from 1824, and instituted 1843. From 1806 university lines began to appear in first steps toward founding a medical dept., which the state authorized 1810, and full work in which began 1813, with Nathan Smith, Eli Ives (q.v.), and Jonathan Knight as professors, and a building at the head of College st., bought 1814 with a state grant of \$20,000. Dr. Dwight's anticipations were also of departments of theology and of law, with Nathaniel W. Taylor, D.D. (q.v.), as Yale's theologian—a hope fulfilled 1822. Students from all parts of the country began now to give Yale a national character. Pres. Dwight's foresight had secured the present college square 1796, and new buildings were erected—North Middle College as a dormitory; the Lyceum for chem. laboratory, library, and recitation-rooms, 1801-03; and a new president's house at the n.e. corner of the campus. Pres. Dwight was the parent of the modern Yale—the Yale of Silliman, Kingsley, and Taylor; of Day, Woolsey, Porter, and the second Dwight—and of the Yale University of to-



day. He was one of the strong and broad men in American history. Even as the founder about 1785 of an academy, which soon gained national reputation, he was the pioneer of equal education for women, his custom, strenuously advocated, having been to assign to girls the same courses of study as to boys.

It was as Pres. Dwight's lieutenant that Prof. Jeremiah Day, D.D., LL.D. (q.v.), an unobtrusive scholar, but versed in the new system of faculty government and university development, became pres. 1817-46; and carried on Dr. Dwight's work, with such masters of instruction under him as Dr. Dwight's spirit had called forth, or was later to call forth—Silliman, Kingsley, Woolsey, Thacher, Goodrich, Stanley, Olmsted, Taylor, and Fitch. Eleazar T. Fitch, D.D. (q.v.), became divinity prof., and was college preacher and pastor (until 1852); Chauncey A. Goodrich, D.D. (q.v.), filled a new chair of rhetoric (until 1839); Kingsley's chair became in 1831 that of Latin only, while Theodore D. Woolsey took a new chair of Greek; Thomas A. Thacher became asst. prof. of Latin 1842, succeeded Kingsley 1852, and served to 1886, Apr.; Denison Olmsted, LL.D., took the chair 1825 which was divided 1836 into nat. philosophy and astronomy (retained by him), and mathematics, a new chair to which Anthony D. Stanley was appointed. Dr. C. A. Goodrich, on taking later, 1839, a Divinity School chair of the pastoral charge, was succeeded as prof. of rhetoric by the Rev. William A. Larned (until 1862), but without losing his place as a most impressive speaker to the students on religious themes, and conductor of religious exercises.

From 1826-30 such studies as Eng. grammar, geography, and arithmetic gave place to modern languages, political economy, and law. From 1830 the system of having a division of each class instructed in Greek, Latin, and mathematics by the same tutor was changed, at the instance of Horace Bushnell, later known as one of the most brilliant of preachers, to that of assigning each tutor one subject for all the divisions of a class. The question of abandoning the required study of Greek and Latin was so far agitated 1828 as to be made the subject of an exhaustive report to the corporation by the faculty, with the result so much against the new proposal as to lead to putting Stanley on Latin only, and Woolsey, in a new chair, on Greek only, with Thacher also for Latin, 1842-46, and James Hadley, LL.D. (q.v.), for Greek, 1848-72—under whom freshman Greek became the most fruitful discipline of the four years' course. Theology became a distinct dept. from 1822, with Nathaniel W. Taylor in a chair of didactic theology (until 1858), from which proceeded, during a third of a century, the chief influence tending to 'new school' modification of Calvinistic divinity, the advance of which modification has, in another third of a century, gone far beyond the limits which Dr. Taylor thought final. The academical professors, Kingsley, Fitch, and Goodrich, lent help in the Divinity School, supplementary to the marvellously vigorous and inspiring work of Dr. Taylor.

Josiah W. Gibbs became lecturer on sacred literature 1824, and full prof. 1826. A Divinity School dormitory was erected 1835-6, as the north end of the row of college buildings, which had been extended by North College 1820-1, and a new chapel 1823-4, separating North and North Middle. An upper story of the chapel contained rooms for students, and over these an attic housed the college library (until 1843), and later a part of the early work of the Scientific School. A central building on the campus, 1818-9, provided a new and large dining-hall, with basement as kitchen, and with an upper floor occupied by Prof. Silliman's cabinet of mineralogical specimens, while the old dining-hall became his chemical laboratory. In 1842 the system of a common dining-hall was abandoned, and the rooms were given to nat. philosophy. After 50 years a return to the system of commons for students was decided on for 1892-3. The Trumbull Gallery, a small structure, used for offices for the pres. and treasurer, was erected 1831-2; a considerable library building was begun 1842, and completed 1846 at a cost of \$34,000.

State aid for the college had become after 1831 (when \$7,000 was given for Trumbull Gallery) so uncertain as to occasion an organized attempt to enlist the alumni in systematic effort to secure funds, and \$100,000 was raised 1831-36. In 1824 steps were taken toward the creation of a law school—outside students being enrolled, and, from 1826, their teacher, Judge David Daggett, serving as law prof. to the college. In 1843 degrees in law began to be given. The earliest plans for graduate study date from 1841, when Edward E. Salisbury, LL.D. (q.v.), was appointed prof. of Arabic and Sanskrit. Within the range of Yale, under Pres. Day, Amherst College was founded 1821, Trinity at Hartford 1823, and Wesleyan at Middletown 1832. The annual average of graduates, which had been about 56 under Dwight, was about 90 under Day.

The more recent period of Y. U. covers the presidencies of Theodore Dwight Woolsey, D.D., LL.D. (q.v.), 1846-71; Noah Porter, D.D., LL.D. (q.v.) 1871-86; Timothy Dwight, D.D., LL.D. (b. 1828) (q.v.), 1886-99; and Arthur T. Hadley, LL.D., since 1899. Dr. Woolsey after he became pres., an ordained minister, instructed for 25 years in history, political science, and international law. His unique intellectual and moral force constitutes one of the historic treasures of Yale. Dr. Porter took 1847 a new chair, moral philosophy and metaphysics, and continued until his death, 1892, one of the most eminent living authorities in that dept. of study. The second Pres. Dwight, grandson of the first, was the Divinity School prof. of sacred lit. from 1858, and especially represents that dept. of the univ., which from 1866 has had rapid development, and now has two large Divinity Halls, a chapel, and a library building. The Academical dept. has added large and costly dormitories—Farnam 1870; Durfee 1871; Lawrence 1886; and Welch 1892. A new chapel, the Battell Chapel, was provided by gift 1876; also the Peabody Museum (in part); the Observatory (in part) 1882; the



Sloane Physical Laboratory 1883; Dwight Hall, for student religious use, 1886; the Kent Chemical Laboratory 1887; the Chittenden Library 1889; and a very costly new gymnasium 1892. Vanderbilt Hall and White Hall, dormitories, were added 1894. Phelps Hall, a noble portal to the univ., commemorates William Walter Phelps. In 1886 the designation Yale University was officially authorized. Under Porter, and especially under Dwight, the number of professors, instructors, etc., has greatly increased; and, responsive to Pres. Dwight's vigorous and popular administration, the funds and income of the institution have had extensive additions by gifts and bequests. Both the Medical School and the Law School have made great gains, and are very efficient branches of the university. The Street Art School, opened 1869, has become a strong centre of art teaching and influence. It only of the depts. of the university has been open to women until 1892, when a new departure threw open the entire graduate dept., in all its courses, to women equally with men—having in view the demands of those who, having graduated at a college, are seeking to extend their education in higher departments.

The Sheffield Scientific School, begun 1854, and established on a strong foundation 1859–82 by the munificence of Joseph E. Sheffield, has grown into one of the best schools of science in the country. It requires all applicants for admission to pass in preparatory Latin and mathematics, in Eng. grammar, geography, and U. S. history. German and the critical study of English are begun in the freshman year, and the classics are replaced by physics, chemistry, botany, etc. One prescribed course is taken by all Freshmen. For the 2d and 3d years, called Junior and Senior, one of seven different prescribed courses must be chosen—(1) chemistry, (2) civil engineering, (3) mechanical engineering, (4) agriculture, (5) natural history, (6) biology, (7) select studies. Designed at first, 1846–7, to offer only graduate courses, it soon became also a college for sciences and arts parallel to the Academic dept., with a three years' course, and without requirement of attendance on religious exercises in the college chapel. Aided by a state (agricultural) grant of \$135,000, it was mainly founded and developed, 1859–82, by Joseph R. Sheffield (q.v.), who gave all the land and buildings, and much of the apparatus and endowment, with which to found the school, which has become second to none in America. A recent munificent bequest has provided for a fourth large building, to be devoted to mechanical, civil, and electrical engineering, and physics. The notable thing in this great school of science is its introduction and application—now for more than 30 years—of the most advanced college ideals: science in place of the classics, the three years' course, and a voluntary attendance on religious exercises. It is evidently rising to a place of great importance in the future of the university.

The following presents some prominent points in a general summary:

## YALE UNIVERSITY—YALU RIVER.

The university has four departments: (1) Philosophy and the Arts; (2) Theology; (3) Medicine; (4) Law.—The first of the above departments has two sections: (a) the Academical (comprising the four original College classes); (b) the Sheffield Scientific School: it comprises also the School of the Fine Arts and the School of Music. Moreover, there are the various Courses of Graduate Instruction.

The corporation consists of 19 gentlemen, of whom 11, including the pres., are Congl. ministers of the state of Conn. The gov. and lieut.gov. of Conn. are members *ex officio*: the other members are elected by the alumni of the university. The corporation elects the president.—The university, though distinctively and unequivocally Christian in its origin and by its history, is administered with sedulous avoidance of sectarianism. The prevalence of a spirit of Christian liberality is evinced by the fact that there are usually more than 50 Roman Catholics on the list of students in the university. The Young Men's Christian Assoc. of the univ. has organized work for students in all the departments.

The new Library Building was the gift of the Hon. Simeon B. Chittenden, of Brooklyn. The building for the Museum of Nat. Hist. was the gift of George Peabody, of London. The Observatory was the gift of the Hon. Oliver F. Winchester, of New Haven. The buildings of the Sheffield Scientific School were the gift of Joseph E. Sheffield, of New Haven. Other buildings commemorate the generosity of Street, Sloane, Osborn, Lawrence, Farnam, Durfee, Battell, Monroe, Marquand.

There is liberal provision of fellowships and scholarships in aid of meritorious students. In the post-graduate courses there were created (1892) 20 scholarships of \$100 each (sufficient to pay tuition), and 5 fellowships of \$400 each; all open to graduates (men or women) of any college.

**YALU RIVER, BATTLE OF THE:** chief naval battle of the Japan-Chinese war and of recent years; fought 1894, Sep. 17, near the mouth of Yalu river, n.w. of Korea. This battle, which ended in a brilliant victory for the Japanese, supplied the first test of the recent style of war-ships under fire. Eleven Japanese men-of-war, under Admiral Ito, engaged a Chinese fleet of 12 ironclads and cruisers, and after five hours' fighting sank 4 Chinese vessels, and burnt 3 others. The loss of life among the Chinese, who were officered by Americans and Englishmen, was more than 600 men, while that of the Japanese was 67 killed and 197 wounded. Only 3 Japanese vessels were seriously damaged in the battle, and but one of these was obliged to lay up for repairs. The superiority in speed of the Japanese war-ships enabled them to prevent fighting at close quarters and thus they avoided the fire of the heavy guns of the Chinese ships.



## YAM.

YAM, n. *yām* [F. *igname*; Port. *inhame*; W. Ind. *ihame*]: plant of the genus *Dioscorea*, nat. order *Dioscoreaceæ*, distinguished by an inferior ovary and membranous winged fruit. The species mostly are tropical, natives of the E. and W. Indies, etc. They have tuberous roots and herbaceous twining stems. The great fleshy roots of some are much used as food, as are potatoes in temperate climates. They contain much starch, and generally become somewhat mealy and pleasant to the taste when boiled. This, however, is not the case with all: the roots of *D. triphylla*, *D. dæmonum*, *D. virosa*, and several other species with ternate leaves, are very nauseous even when boiled, and are poisonous. The tubers of all the yams contain an acrid substance, which is dissipated by boiling, except those of the species with compound leaves. The WINGED YAM (*D. alata*) is an article of food in daily use in the South Sea Islands. The roots are  $1\frac{1}{2}$ –3 ft. long, and often 30 lbs. in weight, with brownish or black skin, juicy and reddish within. They vary exceedingly in form. The stem, which is winged, twines up tall poles provided for it by the cultivator; the leaves are between heart-shaped and arrow-shaped. Two or three small tubers are generally found in the axils of the leaves. It is supposed that this species may be the original of most, or perhaps all, of the yams cultivated in tropical Asia, Africa, and America—as the Common Yam of the W. Indies (*D. sativa*),



Common Yam (*Dioscorea sativa*).

which has a round stem and heart-shaped leaves; *D. bulbifera*, in which the tubers in the axils of the leaves attain the size of apples; the Prickly Yam (*D. aculeata*), which has a prickly stem and a fasciculated, tuberous root; *D. globosa*, the most esteemed yam of India, which has very fragrant flowers, and roots white internally; *D. rubella*,

another Indian kind, with tubers sometimes 3 ft. long, tinged with red below the skin; etc. The species are not well ascertained. Yams are propagated by means of their tubers; the small axillary tubers, or the small tubers produced at the base of the stem around the neck of the large tuber, being used for this purpose.—A species of yam (*D. Batatas*) was introduced in Europe from the temperate parts of China. It was brought to the United States from France about 1855; but, though many efforts have been made to promote its cultivation, it has never become popular in this country. Though hardy enough to endure the climate of New England, it thrives also in the extreme s. When grown from small tubers two seasons are required for production of a crop, but pieces of large tubers give a moderate yield late in the year in which they are planted. Once started, the yam does not need replanting, as it spreads naturally and lives through the winter. Propagation is effected by planting either pieces of the large tubers, or the axillary tubers (about the size of peas), which may be forced by covering the vines with soil and cutting them off near each pair of leaves after the roots have started, or the small tubers which grow around the necks of the large ones. The ground should be deeply plowed, and the tubers planted, as soon as the weather is warm in the spring, in rows 3 ft. apart and 10 to 12 in. apart in the rows. Cultivation is required only to keep the land free from weeds. A large part of the growth of the tubers is made late in the autumn. Where the winters are extremely severe it is well to cover the plants with straw late in autumn, but the straw should be removed early in spring. As the tubers are club-shaped, and grow 15 to 30 in. long, with the large end down, they are very difficult to harvest. Well-ripened tubers have white flesh which, when boiled or roasted, is dry and nutritious, and in flavor somewhat resembles the potato, though it is usually considered decidedly inferior thereto. The yam blossoms when the tubers are two years old; and when allowed to climb on poles, or an arbor, is quite pretty. Under the name Cinnamon Vine it is often sold as an ornamental plant.

YAMA, *yām'ā*: Hindu god, represented at the epic and Purân'ic period of Hinduism (see INDIA—*Religion*) as the sovereign of the Manes, and the judge of the dead; appearing in the hymns of the R'igveda as son of *Vivas'wat* and *Saran'yû*, and twin-brother of *Yamî*, whose desire to become his wife he resists. His father is sometimes called also the *Gandharva*; and he is further represented there as possessing two four-eyed dogs, which guard the road to his abode (see J. Muir, 'Yama and the Doctrine of a Future Life, according to the R'ig-, Yajur-, and Atharva-vedas,' in *Journal of the Royal Asiatic Society*, New Series, 1865, I. 287 ff.). The idea represented by these mysterious deities has been differently understood. Prof. Roth takes *Vivas'wat* for the light of heaven, *Saran'yû* for the dark storming cloud, and Y. and *Yamî* as representing the first human pair—the originators of the race, or the Vedic Adam and Eve produced by the union of the damp vapor



## YAMA.

of the cloud and the heavenly light. The Vedic hymns, however, do not afford the slightest ground for such a fantastical interpretation of these names; and as regards that of Y. and Yamî, they discountenance it distinctly by describing Y. as resisting the sexual alliance with his sister. Prof. Max Müller understands *Vivas'wat* to represent the sky; *Saran'yû*, the dawn; Y., the day; and *Yamî*, the night (*Lectures on the Science of Language*, 2d Series, Lond. 1864, p. 509 ff.). But this interpretation, too, is open to strong doubts, inasmuch as there is no valid ground for identifying the luminous deity *Vivas'wat* with the sky, or *Saran'yû* [from *saran'a*, going, moving] with the dawn. It seems more probable that the phenomena symbolized by this myth are not of a luminous but of an ærial character; the kindred myth of a luminous character being that of the *As'wins*, who are likewise the twin progeny of *Vivas'wat* and *Saran'yû*, or rather of *Vivas'wat* and 'a form



Yama.

similar to that of *Saran'yû*, and who represent the transition from darkness to light, and the inseparable duality produced by the intermingling of both (see J. Muir, 'Contributions to a Knowledge of the Vedic Theogony and Mythology. No. 2,' in *Journal of the Royal Asiatic Society*, II., 1865). For as *Vivas'wat*, 'the expanding,' probably implies the firmament 'expanding' to the sight through the approaching light, *Gandharva*, as usual, the solar fire, and *Saran'yû*, the dark and cold 'air' (the moving element), Y. and *Yamî* seem to represent the current of air produced by the effect of the solar heat emanating from the firmament on the cool air of the night, when the antagonism between the warm and cold air of which this current consists would be Y. repelling the union with his sister *Yamî*, though, at the same time, they are 'husband and wife while yet in the womb' (of the night-air). And since this phenomenon extends over the whole atmosphere,

the two four-eyed watch-dogs of Y. are probably the eight or twice-four regions of the compass, either each couple of them taken together with their intermediate regions—whence both dogs are called spotted—or the four regions and the intermediate four taken separately—whence one dog is also called *dark*, and the other *spotted*. Y. being produced by the solar heat, it is easy to understand why it is said of Agni, the (solar) fire, that he is born as Y., and Y. being a phenomenon of the air, why he is also identified with Vâyu, the wind, and why the intermediate space between heaven and earth is assigned to him as his domicile. It is probably a later conception of the Vedic period which describes this abode as having been made for him by the spirits or *Manes*, and Y. as having been the first who found his way to it; and a still later one which represents him as the first of *mortals* who went to that world, for in passages where these ideas are expressed there is an association between the moving air and departed life which is foreign to the oldest notions of the Vedas. It led to the position which subsequently Y. assumed as a luminous king who dwells together with the Manes, and as the lord of Death—Death then becoming his messenger. Yet in the R'igveda, he has not yet the office of judge of the dead which is assigned to him in the later mythology of the epic poems and Purân'as, and probably already in some of the Upanishads. At the epic and Purân'ic period, Y. entirely loses his cosmical character, though he is still called the son of Vivas'wat. He then marries 13 daughters of the patriarch Daksha, is installed as the king of the Manes, becomes the regent of the South, and resides in Yamapura, a town of the infernal regions, where he sits in judgment over the souls of the departed which are brought before him. They are generally fetched by his messengers, who draw them with nooses out of the bodies which they animated; but in the case of very pious persons, he assumes himself the function of separating the soul from the body. After the soul has been brought before him, he orders his recorder, *Chitragupta* or *Chandragupta*, to read to him an account of all the good and bad actions that the soul had done during its life, and which are kept registered in a book called *Agrasandhânî*; and according to their merit or demerit, it is sent to heaven or the infernal regions. The precise knowledge which the Purân'as pretend to possess of all these proceedings extends to the description which they give of this recorder, and to their enumeration of the assessors who co-operate with Y. at his court.—Y.'s sister is *Yamunâ* (q.v.). Among his other names, *Dharma* ('justice'), *Dharmarâja* ('king of justice'), *Antaka* ('the ender'), *Kâla* ('time'), and *S'râddhadeva* ('the god of the S'râddha'—q.v.) are of usual occurrence.—When represented, he is of grim aspect; his color is green, his garments red, and he rides on a buffalo with a crown on his head, in one hand holding a club, in another the noose.

YAMADOU, n. *yă'm'a-dô* [Guianan name]: in *bot.*, an oil expressed from the seeds of *Myristica sebifera*, a tree about 10 ft. high growing in Guiana.



## YAMBU—YAMUNĀ.

**YAMBU**, *yām'bō*, or **YEMBO**; properly **YANBO** (*Iambia* of Ptolemy): maritime town of Arabia, on the coast of the Red Sea, about 130 m. s.w. of Medina, on the edge of a barren plain between the mountains and the sea, fronting the n. extremity of a narrow winding creek. It shares with other places the title 'Gate of the Holy City,' and is the third quarter of the caravan road from Cairo to Mecca, and is thus a place of importance. Y., being the port of Medina, is supported by a considerable transport-trade and extensive imports from the w. coasts of the Red Sea. The harbor is good and well sheltered. The city is surrounded by walls with turrets, outside of which are a few domes and tombs. The streets are wide. The houses stand at considerable distance from each other, are of limestone and coralline, and have huge hanging windows. There are a large market-place, a custom-house, some whitewashed mosques of very simple form, and a few caravansarais. According to Burton, 'there is an independent bearing about the people, strange in the East; they are proud without insolence, and look manly without blustering. Moreover, the population has a healthy appearance.'—Pop. estimated by Von Maltzan not more than 4,000.—See Burton's *Pilgrimage to El-Medinah and Meccah* (1855).

**YAMMER**, v. *yām'mér* [imitative: Ger. *jammern*, to lament, wail]: in *Scot.*, to cry out piteously; to whine.

**YAMŪN**, or **YAMĒN**, n. *yá'mŭn* [Chinese, 'flag gate']: the suite of buildings which serve as the official and private residence, and place of business, of a Chinese mandarin who holds a seal; a government office, or bureau where the business of a particular region or department is transacted. The *Tsŭng-li Yamŭn* (*tsŭng-lě yá-mŭn*), or 'general managing bureau,' is the department of the Chinese govt. at Peking which attends to foreign affairs and forms the channel of communication between the foreign ministers and the throne. It was established shortly after the capture of Peking by the British and French 1860, and consists of 11 members, who consult together under the presidency of one of the princes.

**YAMUNĀ**, *yá-mō'nā*, the modern **JUMNA**: one of the sacred rivers of the Hindus, and mentioned as such in the hymns of the *R'igveda*. Bathing in it, especially where it falls into the Ganges, at Allahabad, was at a later period, and is now, supposed to have the efficacy of removing sin, because at Allahabad the god Brahman is said to have performed a great horse-sacrifice—whence this place is termed *Prayāga*, literally, 'sacrifice,' or *Bhat't'a-prayāga*, literally, 'the best sacrifice.' (Though Allahabad, which is a celebrated place of pilgrimage, is *the* *Prayāga*, this term is applied also to other places where two sacred rivers meet; of which places four, at the confluence of the Ganges with the Alakanandā, Pindar, Mandākinī, and Bhāgīrathī, are, besides Allahabad, held in especial sanctity, and severally called *Nanda*, *Karn'a-*, *Rudra-*, and *Deva-Prayāga*.) In the Purāṇic mythology the Y.—in Sanskrit, a word in the feminine gender—is called a sister of the god *Yama* (c.v.);

## YANCEY—YANG-CHOW-FŪ.

and a legend is told in regard to her, according to which Balarâma, brother of Kr'ishn'a (see VISHN'U—the 8th Avatâra), once ordered the river to come to him, and, as she disobeyed his bidding, plunged his plowshare into her banks, and dragged her to him. Y., the legend continues, was thus compelled to quit her ordinary course, and to follow Balarâma whithersoever he went. At last, however, appeased by her entreaties, he let her go, after she had watered all the country. Prof. Wilson, in his translation of the *Vishn'u-Purân'a*, appends to this legend the following remark: 'The legend probably alludes to the construction of canals from the Jumna, for the purposes of irrigation; and the works of the Mohammedans in this way, which are well known, were no doubt preceded by similar canals dug by order of Hindu princes.'—*Vishn'u-Purân'a* (Lond. 1840, p. 572).

YANCEY, *yǎn'sǐ*, WILLIAM LOWNDES: politician: 1814, Aug. 10—1863, July 28; b. Ogeechee Shoals, Ga. He was educated at Williams College; was admitted to the bar at Abbeville, S. C.; removed to Ala. 1837; edited the *Cahawba Democrat* and the *Wetumpka Argus*; served in the Ala. legislature, and in congress 1844-47; and was a member of the national democratic convention 1848. He vigorously opposed the compromise measures of 1850, became a leader of the extreme pro-slavery party, and worked indefatigably to 'fire the southern heart' and bring about secession. In 1860, Apr., he withdrew with other extremists from the democratic convention at Charleston; canvassed the north and west in the presidential campaign 1860; reported the ordinance of secession at the Ala. convention, Montgomery, 1861, Jan. 7; and in Feb. was appointed a commissioner to secure the recognition of the Confederate states by the European powers. After his return 1862 he served in the Confederate senate till his death, near Montgomery.

YANG-CHOW-FŪ, *yáng-chow-fô*: city of China, cap. of the dept. of Y., prov. of Kiang-sû; on the Yun-liang-ho or Grand canal (n. of the Yang-tse); lat. 32° 21' n., long. 119° 15' e. Like all Chinese cities, it is surrounded with a crenelated wall 3 to 4 m. in extent, and has extensive suburbs. Many of the streets are well built and lined with handsome shops and warehouses. It is an important trading centre, is noted for its candy and sweetmeats, and is the chief seat of the salt manufacture in the eastern provinces. It suffered much during the Tae-ping rebellion, but recovered rapidly. It again received a severe blow when the govt. 'tribute-rice' transport from the s. provinces was diverted from the canal-route to the sea-route to Tien-Tsin. In 1880 the foreign goods taken by Y. amounted to \$484,780.—By appointment of Kublai-Khan, Marco Polo ruled over Y. for three years (about 1282-85). He describes Y. as 'a great and noble city with 27 other wealthy cities under its administration, . . . whose people are idolaters, use paper-money, [and therefore] are subjects of the great khan.'—Pop. estimated 360,000.



## YANG-TSE.

YANG-TSE KIANG, *yáng-tsê kyáng*, or YANG-TZE (or -TSZE) RIVER: river of China, and principal river of Asia; formerly mistakenly called 'The Blue River.' *Yang-tse* is usually but erroneously translated 'Son of the Ocean,' from the frequent substitution in writing of the Chinese character *yang*, meaning 'ocean,' for another character called *Yang*, the ancient name of the region through which the lower courses of the river flow, i.e., from near the e. boundary of the province of Ngan-hwuy to the sea; and the name is strictly applicable to that part alone. In ancient times this mighty river was known simply as the 'Kiang' or River, in the same way as the Hwang-ho or Yellow river was known as the 'Ho,' another word for river.

The Y. rises in the same elevated regions of central Asia which give birth to the Brahmaputra, the Makiang or Mekong, the Salween, and the Hwang-ho or Yellow river. Its course at first is s., winding its way through an apparently level country, and bearing the Mongol name *Mura Ussu*, or Tortuous Waters. The magnitude of the stream must be considerable even in these upper regions, for it was here, beyond the Bayen Khara Mountains, that the missionary traveller Huc (q.v.), in the winter of 1845, saw a herd of wild oxen that had perished by being frozen into the ice while attempting to cross the river. Leaving these upper regions, after traversing the wide territory of Kokonor, the Tortuous Waters run s., entering the province of Yun-nan at about 28° n. lat. The river then flows s.e. through this province, forming a great bight or elbow, at about the middle of which it is joined by the *Ya-lung*, a considerable stream, on which great rafts of timber are floated down, but which is not otherwise navigable. At about 26° n. lat. and 103° e. long. it turns n., forming part of the boundary between the provinces of Yun-nan and Sze-chuen. After entering the latter province it flows n.e. under the name *Kin-sha Kiang* ('River of Golden Sands'), receiving at the city of Seu-chow, on the n. bank, the river Min (navigable for 400 m. to Ching-tû, the cap. of Sze-chuen), regarded by the Chinese as the main stream, the Kin-sha Kiang being a mere affluent. Between Seu-chow and Chung-khing the river is known as the *Min*. At Chung-khing-fû, the second city of Sze-chuen, the seat of a British consul and of several flourishing mission stations, the river Kia-ling comes in on the left, after a s. course of nearly 1,000 m. through Shensi and Sze-chuen. It is navigable for a considerable distance above Chung-khing by river-junks of the largest size. On the s. the tributaries of the provinces of Yun-nan and Kwei-chow are numerous, but not large; the principal is the Kung-tan (from Kwei-chow), which joins the river at Foo-chow about 140 m. below Chung-khing. On the n. the tributaries are numerous and large, and force their way through narrow passes, rolling over lofty precipices, and carrying large masses of ice. At Foo-chow the river again turns n.e. as far as Wan-hien, about 30° n. lat.; thence in a generally e. direction until it enters the province of Hu-peh at about 110° e. long., thence e.-by-s. to I-chang, in the province of Hu-peh,

1,100 m. from the sea, and the limit of steam navigation. The course of the river thus far has been in the main through deep gorges with numerous formidable rapids, projecting rocks, and strong eddying currents, rendering navigation exceedingly dangerous, and in the upward voyage both tedious and expensive. The vessels used in this part of the river seldom exceed 60 to 80 tons burden. They are of special build, and are tracked up by large crews ranging from about 20 to 200 or more men, additional relays of coolies being hired at the more formidable rapids. Disasters are of daily occurrence, and the annual loss of life is very great. It is a moot point whether steamers of light draught could make the upward passage for any great distance above I-chang, on account of the strong current through these gorges and over these rapids: the weight of opinion seems to be against the feasibility. I-chang (pronounced *ê-châng*) is a treaty-port opened to foreign trade by the Chefoo convention of 1876, and is the entrepôt of the salt brought down from Sze-chuen, and the point where upward-bound cargoes are usually transhipped. From I-chang the river flows s.e. to Chi-hiang-hien; thence n.e. to King-chow, and from that point past Sha-sze, an important trading town, to Yǒ-chow-fû, at the entrance of the Tûng-ting Lake (360 sq. m., largest lake of China), through which the Y. receives the waters of the rivers of Kwei-chow and Hû-nan. From Yǒ-chow-fû to Hankow (about 180 m.) the course is n.e., and the banks are generally low, and usually overflowed for quite a distance in the end of summer, when the river is swollen by the melted snows of the mountains of Tibet. At Hankow (the most important trading town of central China, 582 geographical m. from Shanghai) the Y. receives the waters of the Han, which rises in the prov. of Shensi, and flows e. and s.e. for 1,350 m.—1,200 of which are navigable by junks of moderate size. The Y. is here about a mile wide, and has a depth of 42 to 66 ft. The summer level, however, exceeds that of winter by more than 50 ft., and on more than one occasion the native town has been flooded, and the foreign settlement, e. of the native town, laid completely under water.

From Hankow to the sea (about 600 m.) the Y. is navigable by the largest vessels, though not without danger on account of the strong current, shifting shoals, and hidden rocks. Regular steam communication is maintained all the year round with Shanghai and other Chinese ports; and every summer a large fleet of ocean steamers carry large cargoes of tea to London. From Hankow s.e. for about 140 m. the river traverses a vast extent of plain, broken by isolated hills and low ranges on both banks, until the gorge formed by the passage of the river across the range called the Ma-tsze-shan is reached. This is 'a narrow, abruptly winding cleft, the precipitous walls of which afford infinite variations of picturesque and rugged grandeur.' Fifteen m. below Kiu-kiang (a treaty-port on the s. bank, 445 geographical m. from the sea) the river passes the entrance to the Poyang Lake (guarded by the fortified



## YANINA-YANKTON.

city of Hû-k'ow, perched on a high precipitous bluff). The river here turns once more to the n.e., and again becomes compressed, rushing through a narrow gorge scarcely more than 1,200 ft. in width from cliff to cliff. At Ngan-khing-fû, cap. of the prov. of Ngan-hwuy, the course becomes e. and e.-by-n., past Wûhû (q.v.), to Nanking in Kiang-si—designated in the treaty of 1858 as a river-port, but never thrown open to foreign trade. Forty-three m. below Nanking the Y. intersects the Yun-Ho (or *Yun-liang-Ho*, 'Grain Transport River'), i.e., the Grand canal, at Chin-kiang on the s. bank, 150 m. from the sea. Here the river curves slightly s., opening into a wide estuary, in whose mouth lies the island Tsung-ming (32 m. long and 5 to 10 m. wide, formed entirely by alluvial deposit since the 14th c.), and discharges its waters into the Yellow Sea at Sha-wei-shan islet, lat.  $31^{\circ} 25' \text{ n.}$ , long.  $122^{\circ} 14' \text{ e.}$ , after a course of 3,000 m. (about 1,900 m. in direct line).

YA'NINA: see JANINA.

YANK, n. *yǎngk*: a jerk; a twitch; a quick sharp stroke or blow: V. to twitch or jerk powerfully; to snatch away unexpectedly.

YANK, n. *yǎngk*: slang for YANKEE.

YANKEE, n. *yǎng'kē* [supposed Amer. Indian corruption of the F. *Anglais*, English, or of the word *English*, *yaunghees*, *yenkees*, or *yenghees* being the name given by the Massachusetts Indians to the English colonists: comp., however, Scot. *yankie*, a sharp, clever, forward woman; *yanking*, active, pushing: connected with Icel. *jaga*, to move about]: a citizen of New England, or of the northern United States of America; in general, but loosely, an inhabitant of the United States. YAN'KEEISM, n. *-izm*, anything peculiar to the Yankees in language, etc.

YANKEE DOODLE: popular air known originally as *Nankee Doodle*. It is as old as the time of Cromwell. It was known in New England before the revolution; it is said to have been played by the British troops about 1775 in derisive allusion to the then popular nickname of the New Englanders; and afterward the New Englanders, saying that the British troops had been made to dance to *Yankee Doodle*, adopted the air. Though this tune is not discarded as a national air, it probably yields precedence to *Hail, Columbia*.

YANKTON, *yǎnk'ton*: city. cap. of Y. co., S. D.; on the Missouri river, about 7 m. from the mouth of the Dakota river; and on the Chicago Milwaukee and St. Paul, and the Chicago and Northwestern railroads; 61 m. n.w. of Sioux City, 140 m. n.n.w. of Omaha. It is an agricultural region, well located commercially, regularly laid out, and well built. It has steamboat connection with the principal ports on the Missouri river, and is the point of reshipment of govt. supplies for many milit. posts and Indian agencies, and the principal depot of supplies for the Black Hills mines. The city contains the former terr. capitol, city-hall, state asylum for the insane, 10 churches, high and graded public schools, Yankton College (non-

## YANOLITE—YARD.

sect.), opened 1882, public library, gas and electric light plants, and 2 daily, 7 weekly, and 2 monthly periodicals. There are several artesian wells, grain elevators, flour-mills, breweries, railroad machine-shops, meat-packing establishments, and foundry and machine-shop. Y. was named after the Yankton band of Sioux Indians, was settled 1859, became a city 1873, and was the cap. of the former terr. of Dakota. Pop. (1880) 3,431; (1890) 3,670; (1900) 4,125.

**YANOLITE**, n. *yǎn'ō-līt*: a mineral of the garnet family; same as *axinite*.

**YAOURT**, n. *yā-ört'*: a fermented liquor, similar to *koumiss*, prepared by the Turks from milk.

**YAP**, v. *yǎp* [imitative: F. *japper*, to yelp]: to yelp or bark, as a dog: N. the yelp or bark of a dog. **YAP'PING**, imp.: **ADJ.** barking; snapping. **YAPPED**, pp. *yǎpt*.

**YAPOCK**, *yā'pōk*: marsupial quadruped, *Cheironectes palmatus*, of the Opossum family, *Didelphidæ*, the only known species of its genus. It differs from the opossums in having only five molars on each side of each jaw, in its aquatic habits, and in its incapacity for climbing trees. The muzzle is rather sharp; ears are naked and rounded; tail long, scaly, and prehensile; feet webbed; hind-feet with



Yapock (*Cheironectes palmatus*).

an opposable thumb. The Y. inhabits Brazil and Guiana. It is rather larger than a rat; is of brown color, with three transverse gray bands, white on the under parts: it feeds on crustaceans, fishes, etc., and has cheek-pouches, in which it stows away its food.

**YAR**, or **YARE**, *yār*: river of the county of Norfolk, England; rising about the middle of the county, and flowing e. past Norwich. Receiving the Waveney, it widens into the estuary of Breydon Water; is joined by the river Bure at Great Yarmouth; and  $2\frac{1}{2}$  m. below that point it enters the North Sea, after a course of about 30 miles.

**YARD**, n. *yárd* [Icel. *garthr*, a fence, a hedge: AS. *geard*, an inclosure: Dut. *gaard*; OHG. *garto*, a yard, court: allied to L. *hortus*, a garden: Gr. *chortos*, a courtyard]: an inclosure in which any work is carried on, as a *tan-yard*, a *dockyard*; an inclosed space adjoining or inclosing a house or building, as a *barn-yard*; in *Scot.*, an inclosed garden, as a *kale-yard* (or cabbage-garden): V. to put



## YARD—YARKAND.

or confine cattle in a yard. YARD'ING, imp. YARD'ED, pp. YARD-LAND, the area of land, varying in extent from 15 to 40 acres, held by a tenant in villeinage in early English manors.

YARD, n. *yárd* [AS. *gyrd*, *gierd*; Ger. *gerle*, a wand, a measuring-rod: Dut. *garde*, a rod]: a staff or rod 3 ft. long, the unit of long measure throughout the British empire and the United States; the yard contains 3 ft. and each ft. 12 inches; a measure or length of 3 ft. or 36 inches; in a *ship*, a long piece of timber tapering toward each end, slung horizontally by its centre to a mast, and used for suspending certain of the sails, which are called square sails if the yard is suspended at right angles to the mast, and lateen sails if suspended obliquely. It is upheld by the 'lifts,' and trimmed to suit the wind by the 'braces.' The lower sails or courses are upheld by the main, fore, or mizzen yards. Above these are the topsail-yards, the topgallant-sail-yards, and the royal-yards. YARD-ARM, one-half of a ship's *yard*, from the centre or mast to the end. YARD-STICK, a stick or rod a yard long, used in measuring. YARD-WAND, measure of a yard made of a rod or strip of wood.

YARE, a. *yär* [AS. *gearo*, accurate, ready: Dut. *gaar*, dressed: OHG. *garo*, ready]: in *OE.*, nimble; dexterous; ready; answering readily to the helm (as a ship); prompt or swift in movement: AD. in *OE.*, readily; dexterously. YARELY, ad. *yär'li*, in *OE.*, dexterously; skilfully.

YARKAND, *yär-kând'*, or YARKEND', *-kënd'*: town, commercial cap. of E. Turkestan; on the Y. river, in the s.w. corner of the country, s.e. of Cashgar; 38° 25' n. lat., 77° 16' e. long.; about 4,100 ft. above sea-level. It is in the principal oasis of E. Turkestan, and is the centre of a group of smaller towns. The waters of the Yarkand and its tributaries are led everywhere through this oasis for irrigation by means of innumerable canals. There is much mineral wealth in the mountains. The pop. of the oasis is estimated about 200,000. The city of Y. is renowned for its saddlery and leather-ware. It is surrounded with a thick earthen wall, with towers in the Chinese style. The people are Persians (who speak no longer their mother-tongue, but Turkish) and Turkish Sarts. Until Y. was visited by Mr. Shaw, in 1868, we had little reliable information concerning it. He found it to contain long streets, covered in against the rays of the sun, with rows of fine shops, in which goods of every sort, and from every country, were exhibited. He found the bread excellent; the supply of vegetables varied and abundant; the butchers' shops well provided with horse-flesh, camel beef, and mutton. The population seemed industrious, orderly, and well skilled in many of the arts of civilized life. In 1877 Eastern Turkestan (q.v.) was retaken by the Chinese, and Chinese rule was re-established at Y.—See Shaw's *High Tartary, Yarkand, and Cashgar* (1871); Boulger's *Life of Yacoub Beg* (1878).—Pop. of Y., estimated by Forsyth, 60,000.

## YARMOUTH.

YARMOUTH, *yâr'mũth*: seaport-town, port of entry, and county-seat of Y. county, in Nova Scotia; 205 m. s.w. of Halifax, and 90 m. s. of St. John, N. B. It is the s. terminus of the Western Counties railroad, which connects it with Annapolis. Y. is in the centre of a fertile, well-cultivated region, is largely engaged in fisheries, and is the principal ship-building town in the province. It manufactures iron castings, machinery, and wooden-ware; has one semi-weekly and three weekly newspapers, a commercial reading-room, and several educational institutions. —Pop. (1881) 6,000; (1891) 6,089; (1901) 22,869.

YARMOUTH *yâr'mũth*, or GREAT YARMOUTH: municipal and parliamentary borough, important seaport, and fishing and sea-bathing town, on the e. coast of Norfolk, England; 19 m. e. of Norwich, and 20½ by railway; 122 m. n.e. of London. It is about 2½ m. above the mouth of the river Yare, on a slip of land about a mile and a half broad, washed on the w. by the Yare, and on the e. by the North Sea. A bridge connects the town with the suburb of Southtown, or Little Y., on the right bank of the Yare, in Suffolk. Connected with Southtown is the village of Gorleston, near the mouth of the river. The principal streets of Y. run parallel to the river, and are intersected by about 150 cross-lanes or 'rows,' which, being generally not more than 5 to 8 ft. wide, are so narrow as to be impassable for ordinary wheel-carriages. The vehicles for traffic in the rows are called 'Yarmouth carts.' They are low, narrow, and suited for conveying heavy goods. A quay of nearly 2 m. extends along the river; and here are the town-hall, the council-chamber, and several other handsome buildings—the finest houses, however, being along the esplanade on the beach. There are many churches, schools, and other public buildings, including a sailors' home, fisherman's hospital, and military asylum; the principal church being that of St. Nicholas, founded in the 12th c., a handsome cruciform building with tower and spire 168 ft. high: it is one of the largest parish churches in England. The town contains a monumental column 144 ft. high, to the memory of Nelson. On the coast are several batteries, three piers, besides two at the harbor-mouth, several public gardens, and a marine drive and promenade 2 m. long. Vessels of more than 200 tons can enter the harbor, which is formed by the Yare. Y. is the principal seat of the English herring-fishery: the number of boats registered here 1886 was 439, employing 5,000 to 6,000 men and boys. Also the deep-sea fishing, whose product is forwarded daily to London, employs many hands. The curing of fish, especially of herrings, is important, about 10,000 tons of salt being required annually for this purpose and the 'Yarmouth bloater' is highly esteemed in London and throughout the United Kingdom, and indeed in other countries. Ship-building is carried on, and manufacture of ropes, sails, nets, and silk goods; there are also foundries, tan-works, and flour-mills. The coast is dangerous, but in Yarmouth Roads, inside a line of sand-banks, there is safe anchorage. —Pop. (1881) 46,211; (1891) 49,318; (1901) 51,250.



## YARN—YARROW.

**YARN**, n. *yárn* [Icel. and Ger. *garn*; Dut. *garen*, yarn, thread]: wool, flax, cotton, or other fibre spun into thread fit for the weaver; one of the strands of a rope; a familiar term for a story, especially a long-drawn marvellous story, as, *to spin a yarn*.—*Yarn* varies not only in the materials of which it is made, but also in the fineness to which it is spun. This latter quality is of great importance, as on it depends entirely the evenness and quality of the manufacture. To secure uniformity, a lb. of the material is taken as the standard, and this is divided into *hanks* or *cuts*. Thus, with linen yarn, a hank or cut consists of 300 yds.; and if it takes 25 of these hanks to make a lb., the yarn is called 25s; and if 40, 40s; and so on. A hank of wool or cotton consists of 840 yds. No material admits of such fine spinning as cotton: cotton yarn has been produced in Manchester as fine as 700s, of which muslin has been made, and this is probably the finest ever woven; but as a test of machinery, yarn of No. 2150 has been produced—much finer than that of the famous Dacca muslin. A lb. of the finest Sea Island cotton spun of this fineness would be 1,000 m. in length.

**YAR-NUT**, n. *yâr'nût* [see **ARNOTT**]: the earth-nut; the pig-nut.

**YAROSLAV**: see **JAROSLAV**.

**YARPHA**, n. *yâr'fa* [etym. doubt.]: a kind of peaty soil; a soil in which peat predominates.

**YARROW**, n. *yâr'rô* [AS. *gearuwe*—from *gearwian*, to prepare—so called from its supposed curative properties]: a plant having a strong odor and pungent taste; milfoil; the *Achillæa millefolium*, ord. *Compositæ* (see **ACHILLÆA**).

**YARROW**, *yâr'rô*: Scottish stream, rendered famous by song and ballad, rising a little more than a m. e. of Loch Skene, at the place where the counties of Dumfries, Peebles, and Selkirk meet. It flows n.e. through Selkirkshire, and joins the Ettrick about 2 m. above the town of Selkirk, after a course of 25 m. About  $3\frac{1}{4}$  m. from its source, it expands into the Loch of the Lowes, a mile long, and a quarter of a mile broad. Leaving the Loch of the Lowes, the small stream enters the larger St. Mary's Loch, separated from the smaller lake by a narrow neck of land, on which stands St. Mary's Cottage (Tibby Shiels's). St. Mary's Loch is  $3\frac{1}{2}$  m. long, and nowhere broader than seven-eighths of a m. The peaceful grassy hills which surround the loch slope downward to the water's brink, uninterrupted by trees, and compose a scene of quietude, over which broods the spirit of 'pastoral melancholy.' The prevailing calmness of the waters is pictured by Wordsworth in the lines:

Let  
The swan on still St. Mary's Lake  
Float double, swan and shadow.

## YARROW-ON-TYNE—YATES.

**YARROW-ON-TYNE:** see JARROW-ON-TYNE.

**YĀSKA:** see NIRUKTA.

**YATAGHAN**, n. *yăt'ă-găn* [Turk.]: a long Turkish dagger, usually curved: same as Ataghan (q.v.).

**YATES**, *yāts*, ABRAHAM: statesman: 1724, Aug. 23—1796, June 30; b. Albany, N. Y. He was pres. of the provincial congress 1775-6; state senator of New York 1777 and 1779-90; mem. of the continental congress, and at the same time receiver of Albany, 1788-9, and mayor of that city 1790-96. He was active in promoting the cause of the revolution, alike by voice and pen, writing an able series of articles under the name 'Sidney' and other signatures.

**YATES**, EDMUND HODGSON: journalist: 1831, July—1894, May 20; b. London; son of an actor. He was for some years chief of the missing-letter dept. in the post-office, until 1872, when he visited and lectured in the United States. He had been dramatic critic in London for the *Daily News*, and editor of *Temple Bar Magazine*, and of *Tinsley's Magazine*; in 1873-4 he represented the New York *Herald*. In 1874 he established the *World*, of which he was both editor and proprietor. Beginning with *My Haunts and Their Frequenters* (1854), he published many books, especially novels, including *Black Sheep*, a serial (1866-7); *Wrecked in Port* (1869); *Dr. Wainwright's Patient*, and *Nobody's Fortune* (1871); *The Yellow Flag* (1873); *The Impending Sword* (1874); and *Personal Reminiscences* (2 vols. 1884). He was indicted for libel by the Earl of Lonsdale 1884, and sentenced to four months' imprisonment, but was released after two months.

**YATES**, JOSEPH CHRISTOPHER: jurist and state official. 1768, Nov. 9—1837, Mar. 19; b. Schenectady, N. Y.; grand-nephew of Abraham Y. He practiced law in his native place; was mayor 1798-1808; state senator 1806-7; judge of the supreme court 1808-22; and gov. of the state 1823-25. He was one of the founders of Union College. Yates co., between Seneca and Canandaigua lakes, was named in his honor. He died in Schenectady.—His father, CHRISTOPHER Y. (1737-85), was a surveyor of land, and, in the revolution, a col. of engineers; he served also as quartermaster-gen. under Gen. Schuyler.

**YATES**, RICHARD: statesman: 1818, Jan. 18—1873, Nov. 27; b. Warsaw, Ky. His father removed to Springfield, Ill., about 1831. Graduating at Illinois Coll., the son studied law and practiced in Springfield. He was in the legislature 1842-49; a member, as an anti-slavery whig, of the 32d and 33d congresses; and gov. of Ill. for two terms, 1860-64. None of the 'war-governors' was more prompt and energetic than he. On the next day after the attack on Fort Sumter, he called an extra session of the legislature, and immediately garrisoned Cairo. Gen. Ulysses S. Grant received from him his first appointments in the war, the first being that of state mustering officer. Gov. Y. served in the U. S. senate 1865-71. He died in St. Louis on a journey as U. S. commissioner to inspect a railway in Arkansas.



## YATES—YAW.

**YATES, ROBERT:** jurist: 1738, Mar. 17—1801, Sep. 9, b. Schenectady, N. Y. He was educated in New York, studied law, and practiced in Albany with distinguished success. An early advocate of the patriot cause, he wrote notable articles in its behalf under the name 'Rough Hewer.' He was in the state provincial congress 1775-77; was a member of the council of safety; acted on the committee to frame the state constitution; was supreme court judge 1776-90, and chief-justice of the supreme court of N. Y. 1790-98. He opposed the ratification of the U. S. constitution, after sitting in the convention that formed it; his notes on the proceedings of the convention were published by his widow 1839. Retiring from the bench, he was on the commission to settle claims between N. Y. and Vt., also 'military tract' claims of Mass. and Conn. He died in Albany.

**YATES, WILLIAM:** philanthropist: 1767, Nov. 13—1857, Mar. 7; b. Sapperton, England. He studied medicine under the distinguished Abernethy, was connected with St. Bartholomew's Hospital, London, and in 1790 built and conducted at his own expense (\$35,000) a hospital for the pauper insane at Burton-on-Trent. Removing to Philadelphia 1799, he became well known as an earnest advocate of the then new discovery of vaccination. Afterward and until his death he resided in Butternuts, Otsego co., N. Y.

**YAW, v. yaw:** to rise in blisters which break into white froth, as in cane-juice.

**YAW, v. yaw** [Norw. *gaga*, to bend backward; prov. Ger. *gagen*, to rock, to shake]: to steer wild or out of the line of her course, as a ship: N. a temporary deviation of a ship from a direct course, generally due to bad steering on the part of the helmsman, or the bad steering qualities of the ship itself. **YAW'ING**, imp. **YAWED**, pp. *yawed*.

**YAW, n. yaw** [African]: the African name of a raspberry, or a tubercle resembling a raspberry. **YAWS**, n. plu. *yawz*, a certain contagious disease among negro races, common in Africa and elsewhere, consisting of eruptions somewhat resembling raspberries. *Yaws*, technically known as *Frambæsia*, commonly attacks negroes, but has been noticed in Europeans. The disease is preceded by languor and pain in the limbs, and shivering, succeeded by heat and restlessness; and is more severe in children than in adults. After a few weeks the pure glossy-black color of the skin gives place to a dirty dull tint; and the patients often not only loathe food, but take to eating coal, chalk, earth, etc. The skin is then covered for a few days with a white mealy scurf, as if it had been dusted with flour, after which pimples like pin-heads appear on the forehead, face, neck, groins, etc., and increase for a week or more, growing into crusted pustules, which enlarge until the base attains the size of a sixpence, or even a shilling. If the crust is removed, a foul sloughing sore is exposed. The pustules may, however, burst spontaneously, and discharge a thick viscid matter, which hardens to a scab on the sur-

face. In the larger pustules this surface at length becomes elevated into a red granulated excrescence, not unlike a wild raspberry (*Frambæsia*), which is the true and characteristic yaw. In size it may vary from that of a pea to that of a mulberry, and in color it varies with the general health of the patient from a red to a pale white tint. It has very slight sensibility, and never properly suppurates, but discharges a glutinous fluid, which communicates the disease by inoculation. When the yaw has remained for some time, it diminishes in size, and as the pustule heals is finally covered with skin, leaving little or no mark. When the disease seems to have reached its height, one pustule becomes much larger than any of the others, and instead of being elevated is depressed. This is termed the master or mother yaw, and requires much care. When the mulberry-like excrescences appear on the soles of the feet, the resistance of the thick epidermis excites great pain. They are then termed by the negroes *Tubbæ*, or 'crab-yaws.' This disease is endemic among certain tribes of native Africans, and is common among the negroes of the W. Indies and of N. and S. America. It is contagious, but cannot be communicated except by the actual contact of yaw-matter with the abraded skin, or by inoculation, which is sometimes effected by means of a large fly called the yaw-fly. The interval between the reception of the poison and the formation of the eruption varies from 7 to 10 weeks. The disease scarcely ever attacks the same individual more than once. 'Yaws,' says Craigie, in *The Practice of Physic*, 'are liable to be confounded with the cutaneous symptoms of syphilis, with sivvens, with Arabian leprosy, with radesyge, pellagra, and the red leprosy of Cayenne.' [Sivvens or sibbens is a tubercular affection of the skin, often extending to the deeper tissues, very infectious, and said to be endemic in Dumfriesshire, Ayrshire, and Galloway, described first in the latter part of the 18th c.: radesyge, spedalskhed, spedalska, liktraa, a northern leprosy, or marsh sickness, is endemic in parts of Scandinavia, consisting in its fully developed form of 'an eruption of pimples, scales, patches, and tubercular pustules on the skin, terminating in pusiform discharge, with or without ulceration']. Several writers of eminence regard yaws as the same disease as that described in Lev. xiii. (Jewish leprosy), but the description of the symptoms there given is not sufficiently precise to establish their identity. In treatment all that can be done with advantage is to render the progress of the morbid processes as painless as possible. The most important remedial agent is the warm bath; and blood-purifying drinks, e.g., decoction of sarsaparilla, etc., may be prescribed. The Africans have their own native remedies in the bark of trees called *Yuffo* and *Bullanta*, taken in infusion or decoction; and to destroy the mother yaw, they adopt the following barbarous process: Iron is boiled in lime-juice with a quantity of the common black ants and of Malaguetta pepper, and the liquid thus prepared is applied hot to the yaw.



## YAWL—YAZD.

**YAWL**, n. *yawl* [Dut. *jol*, a yawl, skiff: Sw. *julle*; Dan. *jolle*, a yawl]: a light and rather narrow boat belonging to a ship, usually rowed by four or six oars; also, a decked boat having two masts, on the first of which are a lugsail and topsail; and on the aftermost (a kind of jigger rising almost from the sternpost) a driver or fore-and-aft sail.

**YAWL**, v. *yawl* [prov. Ger. *jaueln*; Swiss, *jaulen*, to lament, to wail: Icel. and Norw. *gaula*, to bellow: allied to **YELL**]: to cry; to howl like a dog; to yell. **YAWL'ING**, imp. **YAWLED**, pp. *yawld*.

**YAWN**, v. *yawn* [AS. *gánian*; OHG. *geinon*; Icel. *gina*; Ger. *gähnen*, to gape, to yawn]: to gape; to open or stand wide; to open wide the mouth through drowsiness, weariness, hunger, etc.; hence, to long or be eager: N. a gaping; an opening wide. **YAWN'ING**, imp.: **ADJ.** opening or gaping widely: N. the act of gaping or opening the jaws wide. **YAWNED**, pp. *yawnd*. **YAWN'INGLY**, ad. *-lī*.

**YAWNING**: gaping. This may be the simple result of deficient oxygenation of the blood, or may be brought on by the mere sight of the act in another person; and it is a modification of the ordinary movements of respiration, in which the inspiration is deeper than usual, and is accompanied by a kind of spasmodic contraction of the muscles which depress the lower jaw, and by a great elevation of the ribs and to some degree of the shoulder-blades. 'The purely involuntary character of the movement is sometimes seen in a remarkable manner in cases of palsy, in which the patient cannot raise his shoulder by an effort of the will, but does so in the act of yawning. Nevertheless, this act may be performed by the will, though not completely; and it is one that is particularly excited by an involuntary tendency to imitation, as every one must have experienced who has ever been in company with a set of yawners' (Carpenter, *Principles of Human Physiology*, 8th ed., 280).

**YAZD**, *yâzd*, or **YEZD**, *yēzd*: city of w. Persia, cap. of the dist. of Y.; 190 m. s.e. of Ispahan; on the s.w. of the great desert of Khorassan; lat. 32° 10' n., long. 54° 50' e. It is the great emporium of the internal commerce of the empire. Manufactures of silk stuffs, velvets, cotton and woolen fabrics, arms, and loaf-sugar are carried on, and the bazaars are spacious and well supplied. The pop. includes about 4,000 Guebres (q.v.), who are exempt from military service, and are now said to be well treated, both by the authorities and by the inhabitants. Y. stands on a comparatively small oasis, beyond which is the salt desert, whose shifting sands threaten to encroach on the town, as they swallowed up Old Y., whose ruins are still visible 10 m. n.w.—Pop. (1800) estimated 100,000; (1868) 30,000; (1888) 50,000; (1891) 40,000.

## YAZOO—YEAR.

**YAZOO**, *yá-zó'*: river of Mississippi, formed by union of the Tallahatchee and Yalabusha; flowing s. and s.-by-w. in a very serpentine course, in a deep, narrow, sluggish channel, between fertile cotton plantations, and emptying into the Mississippi river, 12 m. above Vicksburg. It is 290 m. long, and navigable at all seasons.

**YAZOO**: city, cap. of Yazoo co., Miss.; on the Yazoo river, and on the Illinois Central railroad; 48 m. n.e. of Vicksburg, 48 m. n.-by-w. of Jackson. It is in a rich corn and cotton growing region, and, as the river is navigable for more than 200 m. above the city, is an important cotton-shipping point. The city has 8 churches, acad., public schools, cotton-mills, cotton-compress, cotton-seed-oil mill, bank, and 2 weekly newspapers.—Pop. (1880) 2,542; (1890) 3,286; (1900) 4,944.

**YCLAD**, pp. *ē-klād'* [AS. *ge-*, and *clad*]: in *OE.*, clad; clothed: see remarks under *Y-*.

**YCLEPED**, or **YCLEFT**, pp. *ē-klēpt'* [AS. *ge-*, and *clypian*, to call]: 'named;' 'called': see remarks under *Y-*.

**YDANT**: see **EIDENT**.

**YDRAD**, pp. *ē-drād'* [AS. *ge-*, and *dread*]: in *OE.*, dreaded.

**YE**, pron. *yē* [AS. *ge*; Dan. and Sw. *i*; Dut. *gij*; Goth. *jus*; Ger. *ihr*, *ye*]: the pron. of the second person—being the plu. of *thou*—now used only in formal discourses, *you* being the plu. form usually employed.

**YEA**, ad. *yā* [AS. *gea*, *yea*, *yes*: Goth., Ger., and Dut. *ja*, *yes*]: *yes*; *it is so*; *indeed*; *verily*; *true*; *truly*: *N.* an affirmation or affirmative vote; hence one who votes in the affirmative. *Note*.—**YEA**, *yes*, and **NAY**, *no*, were formerly used in answering affirmative questions; **YES** and **NO** in answering negative questions. This distinction is still observed provincially. As terms in general use *yea* and *nay* are now obsolete or provincial.

**YEADON**, *yē'don*: town of the W. Riding of Yorkshire, England; 6 m. n.n.e. from Bradford, on a hill on the left side of the valley of the Aire. It has considerable woollen manufactures.—Pop. about 6,500.

**YEAN**, v. *yēn* [AS. *eanian*, to bring forth young, as a sheep]: to bring forth young as a sheep or goat; to lamb. **YEAN'ING**, imp. **YEANED**, pp. *yēnd*. **YEAN'LING**, n. a lamb or kid: also spelled **EAN**.

**YEAR**, n. *yēr* [AS. *gear*; Dut. *jaar*; Dan. *aar*; Goth. *jer*; Ger. *jahr*; Icel. *ár*]: the period of time required for one revolution of the earth round the sun, or more accurately the interval between one vernal equinox and the next, or 365 days, 5 hours, 48 minutes, 46 seconds of solar mean time. This is called the tropical, astronomical, or solar year; the common year contains 365 days, and is usually reckoned from Jan. 1 to Dec. 31 (inclusive), but may be a space of 12 calendar months, reckoned from any particular date (see below); also the time of a planet's revolution round the sun, as the *year* of Mercury or of Venus. **YEARS**, n. plu. *yērz*, age, or old age. **YEAR'LING**, n. *-līng*, a beast



## YEAR.

in the second year of its age: ADJ. that is a year old. YEAR'LY, a. -ly, happening or coming every year; annual; lasting a year; comprehending a year: AD. once a year; annually. LEAP-YEAR, every fourth year (but see LEAP-YEAR), which is made to consist of 366 days, February having in a *leap-year* 29 days. CIVIL YEAR, the year adopted by a nation for the computation of time—previous to 1752 the civil year in Great Britain began Mar. 25. LUNAR YEAR, the period of 12 lunar months, or 354 days. COMMON YEAR, a year of 365 days. JULIAN YEAR, the year established by Julius Cæsar, consisting of 365 days for three years, and 366 days for every fourth year. GREGORIAN YEAR, the corrected Julian year, now adopted by most civilized nations (see CALENDAR). SABBATIC YEAR, among the *anc. Jews*, every seventh year, during which the land was suffered to lie untilled. SIDEREAL YEAR, the time in which the sun, starting from the place of any fixed star, returns to the same position. YEAR OF GRACE, any year of the Christian era, called *Anno Domini*, usually contr. into A.D. YEAR-BOOK, a book published every year, and containing either seasons, festivals, fairs, etc., for the year, or a digest of information in regard to the happenings of a year, as the statesman's *year-book*.

YEAR: a complete course of the seasons, or a complete revolution of the Earth (q.v.) round the sun. The length of the year was determined variously by the nations of antiquity, the earliest method being the conventional one of making it include a certain number of lunar months; the lunar month being, after the day, the first period of time which was fixed. Twelve lunar months, giving a year of 354 days, were first taken as a near approach to a course of the seasons. This, though an approximation to the true value of a year, was soon found defective by more than 11 days; and it became necessary to intercalate these 11 days, in order to preserve the year in a constant relative position to the seasons. The intercalation was variously effected: thus, the Egyptians, who knew the year of 365 days previous to B.C. 1500, divided it into three seasons ('Winter,' 'Summer,' and 'the Nile,' i.e., *the inundation of the Nile*) of four months each, made each month contain 30 days, and introduced five intercalary days at the end of the 12th month; the Greeks, who generally retained the lunar year of 354 days, added 3 months in the course of every 8 years, giving an additional month to the 3d, 5th, and 8th year of each cycle; the Romans also added additional days, but their system of intercalation was continually changed, not always for the better, till Julius Cæsar caused the adoption of the solar year. The Romans likewise abolished, in Asia, Egypt, and all the other countries under their sway, the old method of reckoning by lunar years, and compelled the adoption of the Julian calendar, according to which the year was assumed to contain 365 days 6 hours. The substitution of the Gregorian calendar in the 16th c. introduced for the average length of the solar year 365 days 5 hours 49 minutes, which differs by only a few seconds from its true value; and this small annual error, as well as the ex-

## YEAR AND A DAY.

cess of the true year over the year of 365 days, is compensated for by means of a succession of *Leap-years* (q.v.).

The time at which the year began varied much among different nations. The Carthaginians, Egyptians, Persians, Syrians, and other Eastern peoples began their year at the autumnal equinox, at which time the civil year of the Jews also began, though their sacred year was reckoned from the vernal equinox. The commencement of the Greek year was at the winter solstice before Meton's time, and was then changed to the summer solstice. The Romans were the first to adopt Jan. 1 as the first of the year, but for some time their example was not followed by subsequent European nations. In France the beginning was Mar. 1 under the Merovingians, Mar. 25 under the Carolingians, Easter under the Capetians, and Jan. 1 from 1564. The ecclesiastical year in Europe generally began Mar. 25 (see DATE). The ancient northern nations reckoned their year from the winter solstice; the Russians, till Peter the Great's time, from Sep. 1, and the same reckoning, known as the Byzantine era, was in use in the Eastern Empire. Of necessity, the beginning of the year among Mohammedan nations has no fixed position in relation to the sun's course or the seasons, it being invariably a lunar year. In astronomy there are several kinds of years, depending on the various configurations of the earth in its orbit, and consequently varying in length. First there is the *tropical* or (as it is sometimes incorrectly called) *solar* year, which, from its being recognized in legislation and history, and commonly applied in the measure of time, has received the name also of *civil* year: this year is defined as the time which elapses from the sun's appearance on one of the tropics to its return to the same, and has a mean length of 365·2422414 mean solar days, or 365 days 5 hours 48 minutes 46 seconds. Next is the *sidereal* year, which is the period required by the sun to move from a given star to the same star again; and this year, affected as it is by Nutation (q.v.) only, is one of the most invariable quantities which nature presents us with, and has a mean value of 365·2563612 mean solar days, or 365 days 6 hours 9 minutes 9·6 seconds. The time which elapses between the earth's arrival at its Perihelion (q.v.) and its return to the same position is known as the *Anomalistic* Year (q.v.), and is equivalent to 365·2595981 mean solar days, or 365 days 6 hours 13 minutes 49·3 seconds. The sidereal and anomalistic years have a merely astronomical importance.

YEAR AND A DAY, in Law: the period of time beyond which, in certain cases, rights, privileges, or liabilities do not continue. Thus, if an estray or a wreck is not claimed within the space of one year and an added day, the original owner cannot recover; or if a person wounded by another dies within that time, his death may be reckoned murder; or if a year and a day have elapsed after signing a judgment, no execution can be issued except by renewal of legal process. In the law of all Gothic nations *a year and a day* meant a year and six weeks.



## YEARADLEY—YEAST.

**YEARADLEY**, *yērd'li*, Sir **GEORGE**: governor of Va: about 1580-1627, Nov.; b. England. He emigrated to Va., and was appointed deputy-gov. 1616, on Sir Thomas Dale's return to England. He was displaced 1617 by Samuel Argall, who proved arrogant and unpopular, and Y. was reinstated 1619. He annulled the tyrannical martial law which had oppressed the planters, and granted an annual general assembly, the first representative assembly in this country. He was superseded 1621 by Sir Francis Wyatt, but again re-elected 1626, and the colony greatly prospered under his administration. He died in England.

**YEARN**, v. *yērn* [Goth. *gairns*, desirous: Icel. *giarn*, desirous; *gīrna*, to desire: Scot. *girn*, to weep, as a child becoming peevish from earnest desire of any object]: to be filled with longing desire; to have a great desire toward an object or end; to feel great uneasiness from a longing desire toward, or pity for some person or thing; to long; in *OE.*, to grieve. **YEARN'ING**, imp.: **ADJ.** having longing desire: **N.** strong emotions of desire, tenderness, or pity; state of being moved with a longing desire. **YEARNED**, pp. *yērnd*. **YEARN'INGLY**, ad. *-li*.

**YEAST**, n. *yēst* [Ger. *gäsch*t, froth of beer: Icel. *jastr*, the rustling of leaves, the scum on sour milk: AS. *gist*, a blast of wind, yeast: Dut. *gest*; Dan. *giær*, yeast: comp. Gr. *zestos*, fervent]: the froth in the working of new beer; a fungus used to bring about alcoholic fermentation; the preparation used for raising dough for bread; barm. **YEAST'Y**, a. *-i*, or **YESTY**, a. *yēst'i*, abounding with yeast; frothy; foamy. **YEAST'INESS**, n. *-nēs*, the state or quality of being yeasty. **YEAST-BITTEN**, in *brewing*, the phrase used when the top barm happens to re-enter the body of the beer. **YEAST-PLANT**, a particular form of fungus which is composed of simple cells, and which will go on increasing by budding for an indefinite time if placed in a saccharine liquid, converting the sugar into alcohol and carbonic acid. **YEAST-POWDER**, a substitute for yeast in the form of a powder, prepared from soda and other substances.

**YEAST**: barm. In the process of fermentation of saccharine fluids containing albuminous matter, as in brewing or wine-making, the originally clear fluid becomes turbid, carbonic acid is evolved, and the substance causing the turbidity gradually separates in a foaming mass of bitter taste and acid reaction. This is yeast; and on examining it under the microscope, it is found to consist essentially of aggregations of small oval cells of vegetable nature, known as the yeast-cells, yeast-plant, or *Torula* (otherwise *Saccharomyces cerevisiæ* (q.v.)). Y., as is well known, has the property of setting up fermentation in saccharine solutions; and beer-yeast, a familiar kind, possesses, according to Prof. Miller, this power in the highest degree, as may be shown by dissolving 4 parts of pure cane-sugar in 20 parts of water, and adding 1 part of fresh Y.: if this mixture be exposed to a temperature of about 80°, in less than an hour fermentation will have begun (see **FERMEN-**

TATION). The investigations of Mitscherlich have led chemists to distinguish two varieties of Y.—the *Ober-hefe*, or surface-yeast, and the *Unter-hefe*, or sediment-yeast, the former collecting on the surface of the fermenting fluid, and the latter forming a sediment. Surface-yeast is propagated by buds (see *TORULA CEREVISIÆ*), and sediment-yeast by spores; and each variety produces specific results on the fermenting fluid. The fermentation induced by the surface yeast is rapid and irregular; while that produced by the sediment-yeast is slow and quiet. The surface-yeast is formed when the saccharine fluid ferments at a temperature of 65° to 77°; while the sediment-yeast is produced chiefly when fermentation takes place at the lower temperature of 32° to 45°. In their chemical relations the two varieties present no apparent difference. On treating Y. with a solution of potash, a cellulose-like substance remains, while an albuminate is dissolved. The action of Y. is destroyed by exposing it to a temperature of 212°, by alcohol, by the strong mineral acids, chlorine, iodine, and bromine, oxide of manganese, creosote, etc.; on the other hand, Y. may be dried at a low temperature or by pressure, and may be preserved in this state without losing its activity. The part which the globules of Y. play in exciting the conversion of sugar into alcohol and carbonic acid is very obscure; but an experiment of Mitscherlich seems to show that the sugar ferments only in those points which are in actual contact with the globules. Pasteur's experiments render it probable that the process of fermentation is connected with the assimilation of the sugar by the yeast-plant during the development of the yeast-globules, or, in other words, that 'the essential condition of fermentation is the conversion of albuminoid matter into organized globules.'

According to Mitscherlich's analysis, the cells of ordinary washed Y. in a condition to excite fermentation contain (the ashes being deducted): carbon 47·0; hydrogen 6·6; nitrogen 10·0; sulphur 0·6; oxygen 35·8; while spent Y. (after fermentation had ceased) contained only 5 of nitrogen. The inorganic matter amounted to 7·3 per cent. of the dried Y., and consisted entirely of phosphates.

For economic uses of Y. in bread-making, brewing, etc., see the respective titles. Beer-yeast (*Cerevisiæ fermentum*) is an article of the Pharmacopœia: it is employed as a stimulant in advanced stages of low fevers, and is serviceable especially in cases where, in consequence of inflammatory symptoms, wine is inadmissible. Neligan has found it of great service in intense tympanitis following parturition. The dose is two tablespoonfuls every three hours, and it may be given in camphor mixture or peppermint water. Yeast-poultice forms an excellent stimulating application to foul and irritable sores. It is composed as follows: Take of Y. six fluid ounces; flour, fourteen ounces; water heated to 100°, six fluid ounces: mix the Y. with the water, and stir in the flour: place the mass near the fire till it rises. This poultice should be renewed every six or eight hours. Its special efficacy depends on the carbonic acid gas which it evolves.



## YEDO—YELLAND.

If surface-yeast or under-yeast be collected and placed on a cloth to drain, and then pressed until nearly dry, it can be kept with care for several months, and in that state is what is called GERMAN YEAST, in which an immense trade has sprung up. It is obtained mostly from great distilleries, and is in large use by bakers. PATENT YEAST is exactly similar, but is raised from a wort made purposely from malt and hops. ARTIFICIAL YEAST is a dough of wheat or other flour, mixed with a small quantity of common yeast, and made into small cakes, which are dried. If kept free from damp, it long retains its fermentive power.

YED'O: see TOKIO.

YEDO, *yěd'ō*, BAY OF: inlet of the n. Pacific, on the s.e. coast of the island of Nipon, Japan; 35°—35° 40' n. lat., and intersected by the 140th meridian of e. long. The city of Yedo is at its n.w. extremity. The depth of water, nowhere great, decreases all along the banks toward the town, which, at low water, cannot be approached within a mile even by a boat. Solid batteries of granite, well kept, and in general aspect not unlike those of Cronstadt, have been erected midway between the anchorage and the shore.

YE'ISK: see JEISK.

YEKATERINBURG': see EKATERINBURG.

YEKATERINOSLAV': see EKATERINOSLAV.

YELATOM': see JELATOM.

YELE'IZ': see JELETZ.

YELIZAVETPOL', or ELIZABETHPOL': see ELIZABETOPOL.

YELK, n. *yělk*: same as YOLK (q.v.).

YELL, v. *yěl* [AS. *gyllan*; Icel. *gella*; Dut. *gillen*, to scream: Sw. *gälla*, to ring, to resound: Ger. *gellen*, to resound]: to cry with a loud, sharp, disagreeable noise; to scream with agony or horror; to shriek hideously: N. a sharp, loud, hideous outcry, as of agony or horror; a hideous scream. YELL'ING, imp.: ADJ. uttering hideous outcries: N. the act of uttering hideous screams; the noise made. YELLED, pp. *yěld*.

YELL: one of the Shetland (q.v.) Islands, and, after Unst, the farthest n. of that group; separated from Mainland by Yell Sound, and from Unst by Blue Mull Sound; 17 m. long, 5½ m. in average breadth; 83 sq. m. The w. coast is rocky and precipitous, but on the whole the surface is tame, and consists largely of moorlands—the greatest elevations being no more than 672 ft. above sea-level. Agriculture is in a backward state, and, though the surrounding seas are generally stormy, fishing is the chief employment.—Pop. (1881) 2,529.

YELLAND, *yěll'land*, RAYMOND D.: artist: b. London, England, 1842, Feb. 2. He came to the United States; studied at the National Acad. of Design and under James R. Brevoort and William Page 1869–71, and in Paris 1886–7 under Luc Olivier Merson. He became a member of the San

## YELLOW—YELLOW-BIRD.

Francisco Art Assoc. 1874; asst. director of the California School of Design 1877-8, and director 1888. His works include *The Lonely Sea*, *Half-Moon Beach*, *Sunlight and Shadow*, *Golden Gate*, *The Golden Gate at Even*, *Mount Hood*, *Mount Tacoma*, *Columbia River*, *Faringford*, *Isle of Wight*, and *Near Dordrecht*.

**YELLOW**, n. *yěl'lo* [AS. *geolo*, *geolu*; Ger. *gelb*; Icel. *gulr*; Dan. *gul*, yellow: L. *helvus*, light yellow—apparently connected with *gold* and *gall*]: one of the primitive or prismatic colors; a bright-golden color; united with blue it yields green, with red it produces orange: **ADJ.** of a pure bright-golden color. **YEL'LOWS**, n. plu. *-löz*, a species of jaundice in horses, cattle, and sheep; a disease of trees. **YEL'LOWISH**, a. *-ish*, somewhat yellow. **YEL'LOWISHNESS**, n. *-nēs*, quality of being somewhat yellow. **YEL'LOWNESS**, n. *-nēs*, the quality of being yellow; in *OE.*, jealousy. **YELLOW-HAIRED**, a. having hair somewhat yellow. **YELLOW EARTH** or **OCHRE**, a massive earthy mineral of the clay family, of an ochre-yellow color and of somewhat greasy feel—when burnt and prepared it is sold as English-red. **YELLOW FLAG** or **YELLOW-JACK**, a flag hoisted on the masthead of a ship to denote sickness on board, or that she is under quarantine regulations, also over hospitals, etc. **YELLOW-HAMMER**, or **-AMMER** [Eng. *yellow*, and AS. *amore*; Ger. *ammer*, a bunting]: a small bird of a yellowish color; also called *yellow-bunting* (see below). **YELLOW METAL**, or **MUNTZ'S METAL**, an alloy of 3 parts of copper and 2 of zinc, which has the property of being malleable, when hot, and hence can be rolled out in sheets like copper. It is used for sheathing ships. **YELLOW PINE**, a name given to both *Pinus mitis* and *P. australis*, ord. *Coniferae*. **YELLOW-THROAT**, a small singing-bird of N. America, of genus *Geothlypis*. **YELLOW-QUARTZ**, limpid and transparent rock-crystal of a lemon, golden, or wine-yellow color; false topaz or citrine. **YELLOW-RACE**, n., in *ethnol.*, a term sometimes applied to the Chinese, Japanese, Mongols, Lapps, Esquimaux, etc. **YELLOW RATTLE**, a common field-plant; *Rhinanthus crista galli*, ord. *Scrophulariaceae*. **YELLOW-ROOT**, a tonic N. Amer. plant, *Hydrastis canadensis*, ord. *Ranunculaceae* (see **HYDRASTIS**). **YELLOW-WOOD**, an Australian timber-tree, *Oxleya xanthoxyla*, ord. *Cedrelaceae*; a tree (*Cladrastis tinctoria*) of Kentucky, Tennessee, and N. Carolina, commonly known in cultivation as *Virgilia lutea*. **YELLOW-WORT**, a plant with a yellow flower, common in limestone regions; the *Chlora perfoliata*, ord. *Gentianaceae*.

**YELLOW BERRIES**: see **FRENCH BERRIES**.

**YELLOW-BIRD** (*Chrysomitris tristis*): bird of the Finch family (*Fringillidae*), native of N. America, where it is very widely distributed. Other names are Goldfinch and Thistle-bird; and sometimes it is called the American Canary. It is rather more than five inches in entire length; the male in summer plumage of bright yellow color, with black crown, wings, and tail, upper and under tail-coverts white. The female is yellowish brown above, ashy brown



## YELLOW COLORS—YELLOW-EYED GRASS. 7

below, and the male assumes a very similar plumage in winter. Yellow-birds are seen often in large numbers, feeding on seeds of thistles and other plants, and seldom alighting on the ground. The nest is made of lichens fastened together with saliva, and lined with soft substances. The song is very pleasing; and it is a sprightly and attractive cage-bird, easily tamed, and capable of being taught tricks. Several allied species are found in w. parts of America.—The name Y.-B. is applied also to a warbler, the Summer Yellow-bird or Summer Warbler (*Dendroica æstiva*), the male streaked with reddish below; it is of general distribution in N. America.

**YELLOW COLORS:** yellow pigments employed by painters. (1) The varieties of chrome prepared from chromate of lead: see **CHROMIUM**. (2) Several colors technically called *pinks*—as *Brown Pink*, prepared as a lake from a decoction of French berries and fustic; and *English Pink* and *Dutch Pink*, both lakes, prepared by different processes from French or yellow berries and turmeric. (3) *Naples Yellow*, mixture of metallic antimony, red-lead, and oxide of zinc calcined, added to a small quantity of lime, then fused, and afterward ground to powder. (4) *King's Yellow*, a tersulphuret of arsenic. (5) *Patent Yellow*, 28 parts of chloride of lead and 27 parts of carbonate of lead well mixed in powder, and then fused together. (6) *Weld Yellow*, prepared from a decoction of Weld (*Reseda luteola*), or dyer's weed, with alum—in fact, another yellow lake: it is much used in paper-staining. (7) *Gamboge*, the chief yellow color used in water-color painting.

**YELLOW-EYED GRASS** (*Xyris*): genus of monocotyledonous plants of the order *Xyridaceæ*. As in the Iris family, which includes Blue-eyed Grass, the genus has narrow equitant leaves (V-shaped in cross-section at base). It is characterized by a leafless flower-stalk; 3 sepals, of which one is larger, membranaceous, and deciduous; 3 fertile stamens on the 3 yellow clawed petals, and alternating with 3 other stamens, in our species cleft and bearded: and a 3-cleft style on a free pod. *X. flexuosa*, of the Atlantic coast bogs, also of the n. prairies, has the lateral sepals fringed on the wingless keel; it is 10–16 in. high, while its variety *Pusilla*, from Penn. to Lake Superior, is 2–9 in., the leaves rarely twisted. *X. torta*, in dry sand from N. J. s., is 9–20 in. high, the stiff thread-like leaves twisted. *X. Caroliniana*, of sandy swamps from R. I. s. along the coast, 1–2 ft. high, has narrow, flat, sword-shaped leaves, the sepals obscurely fringed; and *X. fimbriata*, of the pine barrens, N. J. to Va., 2 ft. high, has strap-shaped leaves, with narrow plumed sepals. In this family is sometimes included what might be called a White-eyed Grass (*Mayaca Michauxii*), of the south, with dense, linear, moss-like leaves; it creeps or floats in shallow water.—The Star-grass (*Hypoxis erecta*), yellow-flowered, with flat, linear, grass-like leaves, belongs to another family, *Amaryllidaceæ*.

## YELLOW FEVER.

**YELLOW FEVER:** disease endemic in low districts near the sea, but under certain circumstances sporadic in other places, never appearing beyond  $48^{\circ}$  n. lat., nor without a temperature of at least  $72^{\circ}$  F., nor more than 2,500 ft. above sea-level; depending in part on causes not yet known, but in circumstances favorable to its production capable of being propagated by contagion. It usually begins suddenly (generally in the night or early morning) with a sense of coldness, rigor, or actual shivering, followed by vascular reaction, as shown by the heat and dryness of the skin, headache, especially over the eyes, and pain of the eyeballs, which are suffused and have a strange drunk-like aspect. The limbs and loins are painful; the tongue is loaded, and its edges are red. There is a peculiar and characteristic flush or suffusion of the face, occupying a zone of about an inch above and below the eyes. Nausea, gastric uneasiness, and a tendency to vomit soon supervene. These symptoms may gradually lessen, and the patient will then regain his ordinary health in 24 or 36 hours; but if the symptoms persist, they soon become more aggravated, and the stomach ejects at first a clear fluid, which soon becomes of dirty-brown tint, and is finally succeeded by the true *black vomit*. A yellow tint on the conjunctiva is observed, which extends to the skin of the face; and as the disease advances, the whole body becomes of yellow color, varying in intensity from a pale lemon to a deep orange tint. The anxious countenance indicates the distress of the patient, who appears agitated by fearful apprehensions or incipient delirium. The skin feels constricted, and is of a pungent heat. The bowels are constipated, and the red, clean, and tremulous state of the tongue indicates the presence of intestinal irritation, consequently the increase of danger. The urine and other excretions are more or less suppressed. Eructations, hiccoughing, and vomiting increase the distress and weakness. The disease in fatal cases usually terminates on the second or third day. The above train of symptoms is not constant: sometimes, when everything seems favorable, black vomit suddenly appears, and the patient immediately succumbs; in other cases, patients experience no symptoms except severe pains in the legs and suppression of urine, and die without taking to their beds. In all cases terminating fatally, albumen appears in the urine on the second or third day. In women the catamenial discharge is sure to appear, whether due or not. The discharges from the bowels, toward the close of the disease, may be black or dark green, and these dark evacuations are succeeded by others resembling dark sandy mud. Recent investigations tend to show that the disease, like so many others, is due to the presence of organic germs in the system (see GERM-THEORY); in this case to a microscopic fungus in the blood. The usual course of Y. F. in its most concentrated form consists of 12 hours of forming period, 36 or 48 of formed or proper fever, and 24 or 36 of declining or concluding period. When the symptoms are less intense, the patient may survive to the 14th day. In



## YELLOW FEVER.

the milder modifications of this disease, the morbid symptoms are prolonged to a considerable extent. Death may occur at any period of the disease, and the mode in which it occurs is by syncope (fainting), uræmia (or poisoning of the blood by accumulation of urea), apoplexy, or asphyxia or suffocation. When the black vomit is plentiful, and the urine free, the intelligence remains unaffected, but the skin becomes cold and damp, the pulse small, and finally imperceptible at the wrist, and death ensues from gradual exhaustion and syncope. When the black vomit is scanty, and the urine is suppressed, the poisoned blood acts on the brain, and the patient exhibits wild delirium, followed by coma, convulsions, and death. The ratio of deaths to cases in the disease is always very high: from Tulloch's statistical Reports on the Diseases of Soldiers, it appears that in the Windward and Leeward command the ratio was 1 to  $2\frac{1}{2}$  (or 3 in every 7 cases died), in the Jamaica command it was 1 to  $1\frac{1}{2}$  (or 3 in every 4 cases died), while in Gibraltar it was 1 to  $1\frac{2}{3}$  (or 3 in every 5 cases died).

There are great differences of opinion as to the proper treatment of Y. F. One of the highest authorities holds that the disease may be cut short or aborted by administering '20 grains of calomel added to 24 grains of quinine, afterward followed by two drams of carbonate of magnesia, and two ounces of sulphate of magnesia in eight ounces of peppermint-water': these aborting doses were repeated at intervals of four or six hours, one dose being generally efficient, though four have been given before the quinine induced its special symptoms of cinchonism. But many physicians who have had much experience of this disease have no belief in the abortive treatment, and some treat their cases with antiphlogistic or lowering remedies, and others with stimulants. It is probable that there is no one mode of treatment suitable for all cases, and that each should be treated according to its special symptoms. The extreme heat of the surface (a temperature of  $107^{\circ}$  has been observed in the arm-pit) may be relieved by frequent application of the wet sheet; cupping or leeches often relieve the head-symptoms; and a blister to the gastric region may relieve the irritation of the stomach. If there is no suppression of urine, and if that fluid is free from albumen, morphia is of much service, but it must be given with great caution. The food should be of the mildest form, such as chicken-tea, arrow-root, sago, and barley-water, and these should be taken frequently in very small doses, because of the state of the stomach; similarly with regard to all drinks, which are most likely to be retained if sucked through a tube or given by tea-spoonfuls. Tea usually disagrees, but cold infusion of oatmeal, and very dilute brandy and water, are usually relished. A high authority on Tropical Diseases, Sir J. Ranald Martin, states that, whenever the disease breaks out, 'the most speedy means of prevention [of its spreading] in respect to towns and garrisons, will always be found in the removal of both the sick and the healthy to a locality where the temperature is sufficiently low, such as a neigh-

## YELLOW FEVER.

boring range or dry ventilated ground.' In all ships on service on the w. coast of Africa and other unhealthful stations, the following rules should be strictly attended to. A prophylactic dose of quinine (five grains) should be administered to the men daily (a precaution that should be taken in all malarious regions, independently of Y. F.). Whenever the fever appears on board, the ship should at once put out to sea, and proceed to the coolest atmosphere within reach. The most immediate measures of prevention should be, to obviate direct solar exposure, to prevent fatigue, and to check any excesses in the use of spirits. Seamen should be kept as remote from unhealthful coasts as is consistent with duty, anchoring every evening a few miles from the shore, if possible. Duties in boats should as much as possible be conducted during the mornings and evenings, the noon-day heats and the deadly nocturnal emanations being equally avoided. When men are landed, they should be encamped on high and dry ground. Meals should be regularly served and carefully cooked, and coffee should be given early in the morning and after unusual fatigue or exposure, and no work should be begun till the coffee has been taken. Holds of ships should not be cleansed on the spots where the fever has originated, or during its prevalence, but the process should be deferred till the vessel is in a colder latitude. Lastly, green wood should not be placed on board ship in hot climates, but the wood should be barked and partly charred.

Dr. Craigie, in *Practice of Physic*, gives the following extensive list of synonymns of Y. F.: '*Febris flama, Typhus ecterodes*, Sauvages and Cullen; *La Maladie de Siam, La Fièvre Matelotte, Vomito Prieta, Chapetonada, Fiebre Amarilla Hispanorum et Hispano-Americanorum*; New Distemper of 1691; Kendal's Fever, Pestilential Fever, Bilious Fever of Gamble; Endemial Causus or Burning Fever of Moseley; Malignant Pestilential Fever of Chisholm; Remittent and Bilious Remittent of Hunter; Concentrated Endemic Fever of Jackson; Tropical Continued Fever of Lempriere.'

We conclude with a short history of this disorder. Long before the arrival of Cortes in Mexico, an extremely fatal epidemic disease prevailed among the native Mexicans. Epidemics of special severity occurred 1545, 1576, 1736-7 and 1761-2. Although Humboldt thinks that the elevation of the table-land of Mexico (7,200 to 7,800 ft. above sea-level) is sufficient to exclude any idea of the identity of this disease, known as *Matlazahuatl*, with Y. F., there can be little doubt, from the similarity of the symptoms, that the two are the same. The Europeans visiting the shores of America soon became painfully familiar with the disease; and it is almost certain that 'the plague' which so often destroyed the English and Spanish troops at the end of the 15th and the beginning of the 16th c. was in reality Y. F. A disease bearing the character of Y. F. appeared 1618 among the Indians in certain parts of Mass., and prevailed with much severity till 1622; and it committed havoc among



## YELLOW FEVER.

the Brit. emigrants to Va. When the expedition against Hispaniola 1655, under Venables, returned to Jamaica, they met there 'an enemy (the plague) more severe than the Spaniards, which in a little time reduced the army, originally 7,000, to fewer than 2,000 men.' There can be little doubt that this plague was Y. F. In 1691 it was very fatal in Barbadoes, where it was known as the *New Distemper*. From about this date, Y. F. has been endemic in the W. Indies. It was unknown at Carthagen and along the coast till 1729, when it committed dreadful havoc; the Spanish galleons never remaining any length of time without interring one-half, or at least one-third, of their men. In 1740 it appeared at Guayaquil, since which time it has often occurred; and in all the towns on the coast of the Amer. continent and islands between 45° n. lat. and 10° s. lat. it appeared in proportion as Europeans began to visit them. 'In this manner,' says Dr. Craigie, 'Vera Cruz, Cumaná, Havana, Acapulco, and La Guayra have successively become its endemial abodes; and its appearance in these towns is as uniform and certain as the arrival of the sun at the tropic of Cancer. Of these places, Vera Cruz and Havana may be regarded as the nursery of Y. F.; and from the month of March to that of Sep. or Oct. the disease rages like a pestilence among the recently arrived Europeans and those natives who descend from the elevated table-lands of the interior.' Until 1793 the disease was regarded as having a spontaneous origin, and as due to tropical peculiarities operating on European and unseasoned constitutions; but that year the doctrine of infection suddenly started. In that year the disease appeared with great virulence in the island of Grenada, and rapidly spread to Caracas in Venezuela, and over the Antilles to Caroline county, Md., Alexandria, Va., several counties in N. C., also to Philadelphia and many parts of Penn., to New York, and even to a few places in Mass. This outbreak was preceded by a few days by the arrival of a vessel from Bulam, on the w. African coast, at a harbor in St. Granada, in which vessel, when stationed off Bulam, fever had been fatally prevalent about five months before. This disease was at the time termed the Bulam Fever, but soon turned out to be ordinary Y. F. Since 1763 Y. F. has very often appeared as an epidemic in the W. India Islands and parts of the southern American states, and has been endemic even in various parts of s. Europe, especially Gibraltar and Malaga. In the last half-century it has had, with two or three exceptions, no prevalence in the Atlantic ports of the United States, but has passed to the Gulf ports and towns on the Mississippi river. The most terrible recent visitation of yellow fever scourged portions of the lower Mississippi valley in the autumn of 1878: in New Orleans and Memphis alone the deaths exceeded 5,000. From the testimony of many medical writers, it is certain that a disease essentially identical with Y. F. prevails endemically along the w. coast of Africa, at Senegal, Sierra Leone, Cape Coast Castle, and the island of Fernando Po.

## YELLOW FIBROUS TISSUE—YELLOW-HAMMER.

YELLOW FIBROUS TISSUE: see ELASTIC TISSUE.

YELLOW-HAMMER, or YELLOW-BUNTING (*Emberiza citrinella*): species of Bunting (q.v.), one of the most common of small birds in most parts of the continent of Europe, from Norway and Sweden to the Mediterranean. It is about seven inches in entire length, and the male is of brilliant plumage, though there is something in the short thick form of the bird, and in the tints and distribution of its plumage, which prevents it from being greatly admired for beauty. It is, perhaps, also the less regarded because it is so common; and in many parts of Great Britain there is even a prejudice against it. In the summer plumage of the male, the head, cheeks, ear-coverts, and nape of the neck are bright lemon yellow, with a few dusky black patches; upper parts of the back and wings are reddish brown, tinged with yellow; wing-primaries are dusky black, with narrow external edges of bright yellow; secondaries, tertials, and wing-coverts dusky black, broadly margined with rich chestnut brown; upper tail-coverts reddish chestnut, edged with yellow; tail-feathers dusky black, the central pair edged with chestnut and tinged with



Yellow-hammer (*Emberiza citrinella*), with Nest and Eggs.

yellow; chin, throat, and whole under surface bright lemon yellow, clouded on the breast and flanks with reddish brown. The tail is slightly forked, and is shorter than that of the common bunting. The knob in the palate is less conspicuous. The female has much less yellow about the head than the male, and her plumage altogether is much less vivid. The Y.-H. frequents hedges and low trees, and is often seen, especially in winter, in the vicinity of houses, in flocks, with sparrows, chaffinches, etc. It generally makes its nest on the ground, under shelter of a bush or a tuft of grass, forming it of moss, roots, and hair. The song of the male is very sweet, and consists of few notes, which have been jocularly set to music with the words, 'A little bit of bread, but no-o cheese.' He is remarkably attentive to his mate, and takes his turn in incubation. In Italy great numbers of yellow-hammers are caught, and fattened like ortolans for the table. It is noteworthy that this bird is rare in insular situations, e.g., in the



## YELLOW-LEGS—YELLOWSTONE.

islands of the Mediterranean, as well as the Orkneys. In Scotland the Y.-H. is known as the Yoldrin or Yite.—In N. America the name Y.-H. is applied to the Golden-winged Woodpecker (*Colaptes auratus*): see WOODPECKER.

YEL'LOW-LEGS, or YELLOW-SHANKS, or LESSER TELL-TALE (*Totanus flavipes*): bird of the Snipe family (*Scolopacidae*). It is about 11 in. in length, the bill  $1\frac{3}{4}$ . In summer the color is ashy brown above, varied with black and white; below white; the throat streaked and the breast and sides dark speckled or barred (less or not at all in winter), and tail marbled or barred with white. It is a valued game-bird of the United States. The European Green-shanks, very similar, was found as a straggler in Fla. The Greater Tell-tale or Stone-snip (*T. melanoleucus*) of N. America is hardly distinguishable from the Lesser, except in its larger size,  $12\frac{1}{2}$  in. in length, and the bill  $2\frac{1}{4}$ . To the same genus belongs the Solitary Tattler, 9 in. long, breast and legs dusky. All these species are noisy; hence some of the names.

YEL'LOW RIVER: see HWANG-HO.

YEL'LOW SEA: see WHANG-HAI.

YEL'LOWSTONE LAKE: beautiful sheet of water in the Yellowstone National Park (q.v.), in n.w. Wyoming; 22 m. long, 12 to 15 m. wide; of very irregular form, somewhat like an outstretched hand; about 150 sq. m. It is 7,738 ft. above sea-level; greatest depth 300 ft. On its banks are many hot springs. The Yellowstone river (q.v.), about 25 m. from its source, flows into this lake at the s., and issues from its n. side. Among the mountains around the lake are Mt. Sheridan and Mt. Langford.

YEL'LOWSTONE RIVER: largest affluent of the Missouri, flowing out of the beautiful Yellowstone Lake (q.v.), high up in the Rocky Mts., 7,738 ft. above sea-level. It flows n. through the Yellowstone National Park (q.v.), forming two grand cataracts; then passes n. through a mountainous region in Montana, from which it emerges into the plains near the mouth of Shields river; thence flowing n.e. to the Missouri river, on the w. boundary of Dakota,  $48^{\circ} 5'$  n lat.,  $104^{\circ}$  w. long. Its mouth is about 2,000 ft. above sea-level, and is 2,400 ft. wide. Its length is about 1,300 m., and steamboats navigate it at high water about 300 m. to the mouth of the Big Horn, its largest affluent. The name is supposed to be from the steep bluff of yellow sandstone on the bank of the Y., above the mouth of the Big Horn river.—See YELLOWSTONE NATIONAL PARK.

## YELLOWSTONE NATIONAL PARK.

**YELLOWSTONE NATIONAL PARK:** district at the n.w. corner of Wyoming, bounded n. by Montana, w. by Idaho; about 62 m. long n. to s., about 54 m. wide e. to w.; nearly a rectangle in shape; 3,312 sq. m. It is mostly in Wyo., with small portions in Mont. and in Idaho. It is mostly an elevated plateau; its highest part 8,000 ft. above sea-level, lowest 6,000. This elevation gives it a very cold climate; snow lies on the ground nearly nine months in the year, and winter begins in Sep. The e. part is occupied by a rugged mountain chain, the Absaroka range, some peaks of which exceed 11,000 ft. in height. These mountains separate the waters of the Yellowstone and Big Horn rivers, and present scenery unsurpassed for sublimity in the United States. The Gallatin range, near the n.w. corner, has its highest point in Electric Peak, 11,155 ft., just within the boundary of the park. Near the middle of the park are the Washburn Mts. (highest, Mt. Washburn, 10,346 ft.); and the Red Mts. (10,385 ft.) are in the s. part. There are many beautiful lakes; and the streams are in part the head-waters of the Missouri and of the Columbia. Little was known of this wonderful district until 1864, when Capt. W. W. de Lacy and party penetrated its w. edge. Another expedition, 1870, under Gen. Washburn, surveyor-gen. of Montana, first made the wonders of this region fully known. In the two following years a thorough survey was made by the geological survey of the territories, with the result that 1872 congress earned the thanks of the civilized world by setting it apart as a 'public park or pleasuring-ground for the benefit and enjoyment of the people.' The chief attraction of the Y. N. P. is its extraordinary diversity of natural phenomena, such as is not brought together within the same area in any other part of the new or the old world. It is a land of streams and waterfalls, geysers and hot springs, diversified by mountains, hills, and dales, and lakes, and covered by a dense growth of coniferous timber. The Yellowstone River (q.v.), tributary of the Missouri, flows through this region: after leaving the Yellowstone Lake (q.v.) it passes for a few miles between high wooded banks; then its bed becomes broken by rocks, and in the Upper Fall shoots over a precipice 112 ft. high. Flowing on quietly for half a mile, it dashes over a ledge of trachyte 300 ft. high into the Grand Cañon, carrying at the average stage about 1,200 cubic ft. of water per second. The water at the edge of this fall is very deep, and of dark green color, and flows down the gorge an 'emerald green stream, dashed with patches of white, beating with furious waves the rocky walls that prison it.' This Grand Cañon, down which the river flows, is a gorge with some scenic effects unequalled on the globe: it is about 24 m. long, with depth of 600 to 1,200 ft. cut at a very steep angle in a volcanic plateau. Its rugged broken walls present an amazing richness of diverse colors. Other streams, tributaries of the Yellowstone, have fine cataracts. Here and there at the foot and on the sides of the cañon walls are sulphur springs. Hot



## YELLOWSTONE NATIONAL PARK.

springs of all sizes are everywhere abundant in the park, of all temperatures from tepid to boiling: they number not less than 3,000. There are also 71 geysers, some throwing columns of boiling water to the height of 200 ft. The waters of the White Mountain or Mammoth Springs are highly charged with calcareous matter, which, being deposited around, has formed a hill 200 ft. high of dazzling white, its sides striped with bands of red and yellow. Around this hill are semicircular basins, from a few inches to 6 or 8 ft. in diameter, and from 2 in. to 2 ft. in depth. At the top of the hill, where are the active springs, is a broad flat terrace covered with these basins, which are 450 to 600 ft. in diameter. Calcareous deposits of past springs abound in the neighborhood as a witness of former activity; the most notable being 'Liberty Cap,' a cone 50 ft. in height, and about 20 ft. diameter at base. The largest collections of springs and geysers are in two valleys at the head of the Madison river, where it is known as the Firehole. The upper valley, 12 sq. m. in extent, contains 26 geysers, irregular and periodic, throwing water to a considerable height; while the floor of the valley is covered with hard, white, glistening crust of silica. These geysers bear such names as Old Faithful, Beehive, Giantess, etc., and throw water 25 to 180 ft. The geyser basin in the Lower valley, 20 sq. m. in extent, is more noticeable for its quiet hot springs. Of its 16 geysers, the finest is that known as the Architectural. There is another collection of 10 geysers at Shoshone Lake, the finest of which is the Union. There are innumerable little lakelets scattered about amid the primeval forest: the most notable of the lakes, and the largest, is the Yellowstone, with the Shoshone, Lewis, and Heart lakes. Of minerals, obsidian and quartz are plentifully found here, also silicified wood. The Y. N. P. offers hotel accommodation for the traveller, and roads have been made to the chief objects of interest. It is accessible by the Northern Pacific railroad, of which a branch extends up the valley of the Yellowstone to within a few m. of the n. boundary of the park—connecting with stage-coaches beyond.

The reservation of the Yellowstone region for a national park has already produced beneficial results in saving from extermination some species of 'game' animals formerly abundant on the w. plains and in the Rocky Mts. A visitor to the park 1891 writes that he saw on Specimen Ridge, at an elevation of 8,000 ft., 300 antelopes, and that 'several large herds' of these animals can be seen in the Blacktail country. Elk, too, are seen in small and large bands: the traveller saw one band that numbered at least 400. That the management of the park is efficient is shown by the sense of security possessed by the animals—e.g., the band of 400 elk showed no alarm, though the traveller, with his horse and dog, was in plain view for an hour. There is a small band of buffalo in the Hayden valley,

## YELLOW-THROAT—YEMEN.

**YEL'LOW-THROAT**, or **MARYLAND YELLOW-THROAT** (*Geothlypis trichas*): bird of the same genus with the Kentucky, the Connecticut, the Mourning, and the far-western Macgillivray's warblers, formerly included with our other warblers in the family *Sylvicolidae*, but now separated as the *Mniotiltidae* of N. America. It ranges from Central America and the W. Indies through the entire United States, replaced w. by a larger variety, *Occidentalis*, with the belly clear yellow; and it remains through the summer, a common and pretty bird in thickets, with a lively song. It is 4½ to 5 in. in length, olive green, the forehead and a band through the eye to the neck jet black; the under parts, from the bill, rich yellow, changing to whitish or buffish on the belly; the female and young without the black, and the colors less bright. The Yellow-throated Warbler (*Dendroica dominica*), rare north, is ashy blue above; and the Yellow-throated Vireo (*Vireo flavifrons*), though olive green above, lacks the black mask, and has a yellow ring around the eye.

**YELP**, v. *yělp* [AS. *gilpan*, *gielpan*, to boast: Icel. *gjálfr*, yelping of dogs, dashing of waves]: to utter a sharp or shrill bark, as a dog: N. a sharp, shrill bark. **YELP'ING**, imp.: **ADJ.** barking: N. the continuous shrill barking of a dog. **YELPED**, pp. *yělpt*.

**YEMEN**, *yěm'én*: in a wide sense, the whole s. and s.w. of Arabia; but, more strictly, only the s.w. corner of the peninsula, bounded n. by Hedjaz and Nedjed, e. by Hadramaut and the Desert. It was known to the ancients as *Arabia Felix* (*Felix* being a mistranslation on the part of Ptolemy of *Yemen*, which does not mean 'happy,' but the land to the 'right' of Mecca); and they obtained from it much frankincense, myrrh, and other costly balsamic substances, in which it abounds more than any other part of the world; they obtained from its ports also the products of India, and other Eastern regions, with which its inhabitants maintained constant trade. The history of Y. reaches back to the highest antiquity. The Joktanides, descendants of Joktan or Kahtan, are its first possessors of whom we have record; and from them it seems to have passed, about B.C. 2400, into the hands of the Himyarites, or Homerites. The Himyarite states and cities of Saba, Thaphar, and Athana or Aden, attained at an early period a high prosperity, carrying on a great commerce by sea and land; and they extended their dominion over a large part of Asia and n.w. Africa: see **ADEN**. The persecution of the Christians by the last Himyarite princes led to overthrow of the Himyarite power by the Abyssinians A.D. 529. From this date till 601, Y. was ruled by Abyssinian governors; then for a short time by the Persians, under Khosru (*Chosroes*) II. The followers of Mohanmed did not succeed in subduing Y. till they had for a considerable time been masters of the rest of Arabia. Under all the caliphs, and even under Saladin, Himyarite princes retained a partial independence, which they reacquired when the Turks, who conquered the country in the 16th c., were expelled in the century following. For more than



## YEN—YENIKALE STRAIT.

two centuries afterward, the country remained under the dominion of a number of Himyarite princes or sheiks, the most powerful of them being for a time the Imám of Sanaa (q.v.). In 1871-73 it was reconquered by Turkey.

The people of Y. differ considerably in physical characteristics, dress, and manners from the inhabitants of other parts of Arabia, and their language gives evidence of a different origin. See SABEANS (dwellers in Yemen); HIMYARIC.

Our geographical knowledge of Y. has been much increased by recent explorations, and charts of its coasts have been laid down by officers in the service of the E. India Company. Through the whole length of the country, 10 to 30 m. from the coast, a chain of mountains extends, between which and the sea is a tract of low ground, the *Tehama*, generally sandy and desolate, but in some places very fertile, and clothed with tropical vegetation. Inland from the mountain chain is a fertile table-land, at a general elevation of about 4,000 ft., yielding the productions of warm temperate rather than of tropical regions. Some of the mountains rise to about 8,000 ft. The slopes even of the more lofty mountains are covered with luxuriant forests, and the mountain valleys are of unsurpassed fertility. The principal exports are coffee, dates, senna, gums and gum resins, wax, ivory, and goat-skin morocco: some grain also is exported. There are no rivers; but some good harbors are formed by natural openings in the coral reefs which line the coast. The principal ports are Mocha (q.v.), famous for the coffee which it exports; Abou Arish, or Gasim; Hodeida; Shehr; and Aden (q.v.), now in the hands of the British. Sanaa, the cap., or nominal cap., is on the table-land. Damar, Taas, Loheia, Beit-el-Fakih, and Zebeed are among the principal towns.

YEN, n. *yěn* [Jap.—from Chinese *yuen*, round, a round thing, hence a dollar]: a dollar; the monetary unit of Japan since 1871. It is represented by both gold and silver coins. The gold yen weighs 1.666 grams, is .900 fine, and about equal in value to the gold dollar of the United States. The silver yen weighs 26.956 grams (416 grains), is .900 fine, and equal in value to the silver dollar of the United States. The yen is divided into cents or hundredths, called *sen* (represented by a bronze coin), and mills, called *rin* (represented by the old copper cash of the country). The fractional silver currency consists of 5, 10, 20, and 50 sen pieces (all of which also are represented by paper). Inconvertible notes of 1, 2, 10, 20 yen, and larger denominations, also are in circulation.

YENIKALE STRAIT, *yěn-ē-ká'lā*; sometimes called STRAIT OF KERTCH: connecting the Sea of Azov with the Black Sea, forming a sea-passage between the Crimea on the w. and the Caucasus on the e.; more than 20 m. long, and at its narrowest less than 2 m. wide. It is shallow and interrupted by shoals, so that cautious sailing and steering are necessary even for small steamers.

## YENISEI—YEOMAN.

**YENISEI**, *yĕn-ĕ-sĕ'ĕ*: one of the largest rivers of Siberia, formed by the junction of the Oulou-Keme and the Bey-Keme, which rise in the mountains on the s. border of Siberia. It flows n. through central Siberia into the Arctic Ocean, forming at its mouth a long estuary. In its upper course it is interrupted by falls and rapids; but afterward flows through a great plain or steppe, receiving many tributaries, of which the principal are the Upper Tunguska or Angara from Lake Baikal; the Middle and the Lower Tunguska. The Y. is 3,400 m. long, and is traversed by steamers. Repeated voyages since 1875 have proved that it is possible during part of the summer for vessels from Europe to sail direct to the mouth of the Y., and to carry back the varied produce of its immense basin.

**YENISEISK**, *yĕn-ĕ-sĕ'isk*: town in the govt. of Y., in Siberia; on the Yenisei; an important trading centre. It has a great annual fair, the chief articles of trade being grain, fish, salt, spirits, and furs. It has a custom-house and arsenal.—Pop. (1880) 7,185.

**YENITE**, n. *yĕ'nĭt* [named after the German town of *Jena*]: a mineral of a black or brownish-black color and sub metallic lustre, consisting of a double silicate of lime and iron, first obtained at Elba; Ilvaite (q.v.).

**YEOMAN**, n. *yō'man* [Goth. *gavi*; OHG. *gewi*; Ger. *gau*; Fris. *ga*, a district, a village, and *man*, a man: Fris. *gaman*, a villager]: a man of small estate in land, after the 15th c., ranking immediately below a gentleman or squire; a farmer [in early Eng. history the term seems to have denoted a common servant]: seaman in a ship of war appointed to attend to the store-rooms: a member of the yeomanry cavalry: in *OE.*, a ceremonious title of a soldier: an upper servant or officer in great households. **YEO'MANLY**, a. *-lĭ*, of or belonging to a yeoman. **YEO'MANRY**, n. *-rĭ*, the collective body of yeomen or farmers. Yeomanry or Yeomanry cavalry, in Great Britain, are a volunteer force of horsemen, originally embodied for home service during the troublous times following the French Revolution, and then comprising infantry as well as cavalry. They serve chiefly at their own expense, and consist largely of farmers and country gentlemen: the organization is by counties under the lords-lieut. This corps is available in aid of the civil power, and in time of invasion or apprehended invasion: they numbered (1880) 14,511 of all ranks, costing the country annually about £80,000. **YEOMEN OF THE GUARD**, a veteran company, of 100 old soldiers of stately presence, employed on grand occasions, in conjunction with the gentlemen-at-arms, as the body-guard of the English sovereign. These Yeomen were constituted a corps, 1485, by King Henry VII., and they still wear the costume of that period. Armed with partisans, and in the quaint uniform, the men present a curious sight in the 19th c. The officers of the corps are a capt. (ordinarily a peer), a lieut., and an ensign. There is also a 'Clerk of the Cheque and Adjutant.' All these appointments are held by old officers, and are considered important



## YEOVIL—YETHOLM.

prizes. The whole charge is borne by the sovereign's civil list. The headquarters of the corps is at the Tower of London, where the men are known as *Beef-eaters* (q.v.).

**YEOVIL**, *yō'vil*: a small municipal borough of Somersetshire, England; 40 m. s. of Bristol, 124 m. w.s.w. of London; on the borders of Dorsetshire. It is a busy, handsome place, built of red brick and yellow Hamhill (a neighboring quarry) stone, and situated in a pleasing district on a hillside sloping to the Yeo. The Church of St. John is a large and beautiful cruciform structure of the 15th c., in Perpendicular style: height of the side aisles, and large size of the windows, give it grace and lightness; hence it has been called the 'Lantern of the West.' There are several other churches, besides schools, almshouses, and other charities. Kid and other gloves are here more extensively manufactured than in any other town in England: there are about 20 manufactories, producing about 10,000 dozen pairs of gloves per week. The women, who sew the gloves, work at home. Woollen manufactures and leather-dressing also are carried on.—Pop. (1871) 8,527; (1881) 8,480; (1891) 9,648.

**YERBA**, n. *yēr'ba* [Sp. *yerba*—from L. *herba*, a herb]: *maté* or Paraguay Tea (q.v.).

**YERCUM**, *yēr'kūm*: an E. Indian name of the plants called Mudar (q.v.), and their fibre.

**YERGAS**, n. *yēr'gas* [etym. doubtful]: a coarse woollen fabric for horse-cloths.

**YERK**, v. *yēr'k* [another spelling of **JERK**, which see]: to throw out or move with a spring; to lash; to strike; in *Scot.*, to bind tightly: N. a sudden or quick thrust or motion. **YERK'ING**, imp. **YERKED**, pp. *yērkt*.

**YES**, ad. *yēs* [AS. *gese*; Ger. *ja*; yes (see also **YEA**)]: a word expressing affirmation or consent; even so.

**YESTER**, a. *yēs'tēr* [AS. *geostra*, yester: Dut. *gisteren*; Goth. *gistra-dagis*; Ger. *gestern*, yesterday: L. *hesternus*, of yesterday: Icel. *gær*; L. *heri*, yesterday]: next before the present day; last—rarely, if ever, used except in compounds. **YES'TERDAY**, n. *-dā* [AS. *geostrandæg*, yesterday]: the day last past; the day immediately preceding the present one: AD. on the day before to-day. **YES'TEREVE**, n. *-ēv*, the evening last past. **YES'TERNIGHT**, n. *-nīt*, the night last past: AD. on the night last past. **YESTREEN**, n. *yēs-trēn'*, in *Scot.*, last night; yesterday evening.

**YET**, ad. *yēt* [AS. *gyt*; Fris. *ieta*, *eta*, yet, still: Gr. *eti*, yet]: beside; still; once again; at this time; even; after all: hitherto; thus far; up to the present: usually with a *negative*: CONJ. nevertheless; notwithstanding; however.

**YETHOLM**, *yēth'olm*, local pron. *yēt'ūm*: Border village of Scotland, in n.e. Roxburghshire, 7½ m. s.e. of Kelso. Bowmont Water divides it into Kirk-Y. and Town-Y., the former long the headquarters of the Scottish gypsies, who seem to have settled here as early at least as the 17th c., and whose last 'queen,' Esther Faa Blythe, died 1883.—Pop. of Y. (1881) 746. See W. Brockie's *Gypsies of Y.*

## YEW.

YEW, n. *yô* [AS. *iw*; Ger. *eibe*; W. *yw*; Dut. *ijf*, the yew]: a large evergreen tree of the genus *Taxus* and nat. order *Taxaceæ*, which is very generally regarded as a sub-order of *Coniferæ*, and is characterized by solitary and terminal fertile flowers, with solitary ovule sessile in the centre of a fleshy disk, forming a sort of drupe or berry when in fruit, and by dicotyledonous seeds. The genus *Taxus* is distinguished by a solitary terminal seed, surrounded by a succulent cup. The species are diffused over n. parts of the world, and are large and beautiful evergreen trees, with narrow lanceolate or linear leaves. The COMMON YEW (*T. baccata*), a tree of 30-40 ft., with a



Yew (*Taxus baccata*).

trunk sometimes of great thickness, branching a few ft. above the ground, and forming a large and dense head, is a native of middle and s. Europe and of Siberia. Noble specimens of it are seen in many parts of Great Britain. It attains a great age, at least 300 or 400 years. Its wood has been much used from very early times for making bows, for which it is preferred to every other kind of wood. It is very hard, and reckoned almost equal to boxwood for fine work. The heart-wood is of orange-red or deep-brown color. The fruit is red, and was long reputed poisonous, but the pulpy part is not so; the seed, however, is injurious. The leaves also are a powerful narcotic; and though they are sometimes given as a vermifuge, their use is attended with danger.—The IRISH YEW (*T. fastigiata* of Lindley, *T. Hibernica* of Hooker), originally discovered in Ireland, and now very common in pleasure-grounds, is by many supposed to be a mere variety of the common species, with upright fastigate habit; but it differs also in having the leaves scattered, while those of the Common Yew are in two rows.—The NORTH AMERICAN YEW (*T. Canadensis*) is of humbler growth. It is known as Ground Hemlock, and is a prostrate shrub, with large deep-green



## YEX—YEZO.

leaves as compared with hemlocks; it is common in shady woods from N. J. to Iowa and north. *T. brevifolia*, a shrub in Mont., is a tree near the Pacific. *T. Floridana*, and *T. globosa* of Mexico, are small trees.—The name JAPAN YEW is sometimes given to *Podocarpus macrophyllus*, a tree of a genus nearly allied to *Taxus*, and recently separated from it. It is a stout tree, native of Japan; its wood much valued for cabinet-work. Other species of *Podocarpus* are natives of warmer parts of Asia, of Chili, New Holland, etc. *P. nucifer* is a lofty tree of the n. provinces of Japan and mountains of Nepaul, from the seed of which an oil is extracted, fit for culinary purposes, though the seed itself is too astringent to be eaten. To the order or sub order *Taxaceæ* belongs also the genus *Salisburia* (see GINGKO), the genus *Dacrydium* (q.v.), and *Phyllocladis*, a genus in which the foliage, as in *Salisburia*, has remarkable resemblance to the fronds of ferns. *P. trichomanoides* is a large New Zealand tree.

YEX, v. *yěks* [AS *giscian*, to sob]: in *old* and *prov. Eng.*, to hiccough: N. a hiccough.

YEZD: see YAZD.

YEZIDI, or YEZIDEE, n. plu. *yěz'î-dê* [Persian]: in *comp. religion*, peculiar Kurdish tribe inhabiting the Sinjar range in Mesopotamia and adjacent regions, and constituting a sect of religionists who, while admitting that God is supreme, believe the devil to be a mighty angel, who will yet be restored to heaven, and who is deserving of worship. They were probably originally Zoroastrians, whose faith became partly modified by the Christians and Moham-medans with whom they came in contact. They believe in the Old Test., and profess respect also for the New Test. and the Koran.

YEZO, or *yěz'ô*, YESSO, or JESSO, *yěs'sô*: most northerly of the four principal islands which compose the empire of Japan (q.v.); about 300 m. in extreme length, a little more than 200 m. in extreme width; about 35,000 sq. m. In recent years Y. has been thoroughly explored, and extensive measures have been taken to colonize the island and develop its natural resources. The population is chiefly in the s.; the hairy Ainos thinly occupy the n. The Ainos, a distinct race from the Japanese, are stupid and good-natured; they are of broader and heavier make, and have a heavy growth of thick black hair, the chest and limbs being frequently overgrown. (See Miss Bird's *Unbeaten Tracks in Japan*, 1880.) Y. is mountainous, with volcanoes; it is rich in fine timber and in valuable minerals, especially coal; the rivers and coasts abound in fish. Bears, wolves, and deer are found. The chief towns are Matsumai (q.v.), Hakodadi (q.v.), and Sapporo. Pop. of Y. (1898) 610,155.

YGGDRASIL, *yǫ'dra-sǫl*: in Scandinavian mythology, a tree, the greatest and most sacred of all trees, which was conceived as binding together heaven, earth, and hell. According to Vigfusson and Powell (in *Corpus Poeticum Boreale*, 1883), Y. is not a primitive Scandinavian idea, but originated after the contact with Christianity, and so a corruption of the cross, the holy rood. Y. is an ash whose branches spread over all the world and reach above the heavens. It sends out three roots in three different directions: one to the Asa-gods in heaven, another to the Frost-giants, the third to the under-world. Under each root springs a wonderful fountain, endowed with marvellous virtues. From the tree itself drops a honey-dew. Among its branches and roots, several animals sit or run about: an eagle, a squirrel, four stags, a serpent, all having their own proper names. The serpent, Nithhöggr, lies at the under-world fountain and gnaws the root of Y.; the squirrel, Ratatöskr, runs up and down, and tries to breed strife between the serpent and the eagle, which sits aloft.

Of this old-world myth too imperfect an account has survived to enable us to read its meaning. Some writers in the middle ages bring it into connection with the Cross. It is striking to find Virgil (*Georg.* II. 291) describing the ash as sending its branches as high into the air as it sends its roots into the earth—

*Æsculus in primis, quæ quantum vertice ad auras  
Ætherias tantum radice in tartara tendit.*

Remarkable coincidences, though of a fragmentary kind, are found in Eastern traditions also.

Jacob Grimm sees an intimate connection between the world-tree Y. and the *Irmenseule*, of which numerous traces are in the records of German antiquity. This is described by Rudolf of Fuld as a great trunk of a tree set upright, and worshipped in the open air; the name *Irminsul* he explains as meaning the universal or all-sustaining pillar (Ger. *säule*, pillar). Such a tree-idol was destroyed by Charles the Great in his conquest of the Saxons 772, at a place called Heresburg, in Westphalia, a chief seat of the pagan religion of the Saxons. The word *irmin*, AS. *eormen*, was frequently compounded with other words in the earlier stages of the Teutonic languages, in the sense of universal, greatest of all. As the primitive nature-worship tended more and more to the personification of particular powers, these trunk-idols were associated with particular divinities, and perhaps had an image set upon them, or were cut into some rude resemblance, as in the case of the Greek pillar-images called *hermæ* (see HERMES). The coincidence of the names *irmin* and *hermæ*, which may, however, be casual, has not failed to be remarked. The Christmas tree of modern Germany may be some kind of offshoot of the old notion of Yggdrasil.

YID, n. *yǫd* [from G. *jüdisch*, Jewish, from *Jude*, Jew, from L. *Judæus*]: slang term meaning a Jew. YIDDISH, a. idiomatic language or jargon spoken by an illiterate class of Jews.



## YIELD—Y'LANG-Y'LANG.

**YIELD**, *v.* *yēld* [AS. *gieldan*, *gildan*, to restore, to repay: Sw. *gälla*, to be worth: Icel. *gjalda*, to pay: Goth. *gildan*, to requite]: to give or render back; to repay; to recompense, to give in return; to bring forth; to produce; to afford; to concede; to admit to be true; to submit; to give way; to give place; to surrender: N. the amount produced; the return for labor or money expended. **YIELD'ING**, *imp.*: **ADJ.** inclined to give way or comply; unresisting; flexible: N. act of producing or paying back; act of surrendering. **YIELD'ED**, *pp.* **YIELD'INGLY**, *ad.* -*lǝ*. **YIELD'INGNESS**, *n.* -*nēs*, the quality of yielding. **YIELD'ER**, *n.* -*ér*, one who or that which yields. **TO YIELD UP THE GHOST**, to expire.—**SYN.** of 'yield, *v.*': to afford; exhibit; allow; permit; admit; grant; emit; resign; give up; accede; assent; acquiesce; consent; accord; agree; comply; conform; cede.

**YING-TSZE**, *yǐng-tzē* (commonly called **NEWCHWANG**, **NIU-CHWANG**, or **NEUCHWANG**): seaport of China; on the river Liao, 13 m. from its mouth; on n. shore of Gulf of Liao-tûng; prov. of Shing-king, s. of Manchuria. Y. is the port of New-chwang, a commercially unimportant town 80 m. further up the river (29 m. by land), designated in the treaty of Tientsin, 1858, as a port to be opened to foreign trade. Owing, however, to its unsuitability for foreign trade on account of the rapid silting up of the river as well as its winding course, the town of Y., 'the camp' or 'military station' (officially known as *Muh-kow Ying*), was chosen as the site of the foreign settlement, 1861, and to this the name New-chwang is usually applied. Y. is on low-lying land surrounded by mud-flats and reed-marshes, on the left bank of the river, and consists of one long muddy street running e. and w., parallel with the river, and several shorter streets at right angles to it. The foreign settlement occupies a strip of land on the river-bank immediately above the native town. Foreign pop. (including the customs establishment, consular families, and missionaries) about 50. Newchwang (Ying-tsze) exports millet, beans, bean-cake, oil, ginseng, silk, indigo, skins, etc., of annual value about \$7,000,000; imports, cotton, woolen, and silk goods, sugar, paper, metals, opium, etc., of annual value about \$3,000,000. There is a bar across the mouth of the river. The shipping trade is mostly coastwise, and stops entirely about 5 months (Nov. to Apr.) every year on account of the ice.—Pop. about 60,000.

**YIN**, *yēn*, **YANG**, *yáng* (called in Japanese **IN**, *ēn*, **YO**, *yō*): in Chinese cosmogony, the two primal forces of nature by the interaction of which all things have been evolved. *Yin* means and represents 'shade,' *Yang*, light; *Yin* is the negative, *Yang* the positive; *Yin* the female, *Yang* the male.

**Y'LANG-Y'LANG**, or **IHLANG-IHLANG**, *ē-láng-ē-láng'*: an anonaceous tree, *Cananga* (*Unona*) *odorata*, native in Java and the Philippine Islands, with long drooping flowers, from which is derived the rich and agreeable perfume called by the same name.

## Y-LEVEL—YODER.

**Y-LEVEL**, n. *wī' lěv'ěl* [Eng. *y*, from the shape of the supports, and *level*]: in *survey.*, an instrument for measuring both distance and altitude.

**Y-MOTH**, *wī' mōth* (*Plusia gamma*): beautiful species of Moth (q.v.), common throughout great part of Europe; about an inch in entire length, without reckoning the antennæ, which are not quite half an inch. The color is lilac, variegated with brown, the upper wings beautifully marbled, with a shining mark nearly in the form of the letter Y, or of the Greek  $\gamma$  (Gamma), whence the names. The lower wings are dirty white, with a broad smoky border, and a white fringe, spotted with black. This moth flies about during the day in summer and autumn. It is very swift of flight. It lays its eggs on the under side of leaves. The caterpillar is slightly hairy, green with a yellow line along each side, and five white ones down the back. It feeds on the leaves of a great variety of plants, as peas, beans, turnips, cabbages, hemp, clover, oats, and other grasses. It sometimes ravages gardens.

**YODE**, v. *yōd* [AS. *eode*]: OE. for *went*.

**YODEL**, or **YODLE**, v. *yō'dl* [Ger. Swiss]: to sing or utter a sound, peculiar to the Swiss and Tyrolese mountaineers, by suddenly changing from the natural voice to the falsetto: N. a sound or tune peculiar to the Swiss and Tyrolese mountaineers.

**YODER**, *yō'dēr*, JACOB: pioneer: 1758, Aug. 11—1832, Apr. 7; b. Reading, Penn.; of Swiss descent. He was the first person to navigate the Ohio and Mississippi rivers for commercial purposes. At the close of the revolution, in which he served throughout, he built a boat at Fort Red Stone (now Brownsville), on the Monongahela river, loaded it with flour, and 1782, May, took it by these rivers to New Orleans, and sold it. With the profits of this enterprise he purchased peltries, which he carried to Havana, and with the proceeds of their sale bought sugar, which he sold in Philadelphia. He afterward removed to Spencer co., Ky., where he was active in helping to equip and keep in the field troops for the Northwest Territory. He died in Spencer county.



YOGA, *yō'ga* [from Skr. *yuj*, join: kindred to the L. *jung*-, Gr. *zeug*-, Gothic, *jiuk*; hence *junction*, and, figuratively, 'concentration, religious or abstract contemplation']: one of the two divisions of the Sāṅkhya philosophy of the Hindus: see SĀṆKHYA. While the first of these divisions, the Sāṅkhya proper, is concerned chiefly in teaching the *tatt-was*, or principles of creation, and the successive development of the latter, the main object of the Yoga is to establish the doctrine of a Supreme Being, and to teach the means by which the human soul may become permanently united with it; and since the Sāṅkhya proper is silent on the creation of the world by a Supreme Being—whence it was charged, though unjustly, by its opponents, with being atheistical—the Yoga, which is called theistical, is considered its complement. According to *Patanjali*, reputed author of this system, the term *Yoga* means 'the hindering of the modifications of thinking;' and by such modifications, which, he says, may be accompanied with afflictions or be free from them, he understands 'the three kinds of evidence—viz., perception, inference, and testimony—misconception or incorrect ascertainment, fancy, sleep, and recollection.' The 'hindering of these modifications' is, according to him, effected either by a repeated effort to keep the mind in its unmodified state, or by dispassion, which is the consciousness of having overcome all desires for objects that are seen (on earth) or are heard of (in Scripture). Dispassion is conducive to meditation; this, again, is of different kinds, and is attained either 'impetuously'—in adopting various transcendent methods—or 'by a devoted reliance on *Is'wara*, the Lord.' This Lord, or Supreme Being, *Patanjali* then defines as 'a particular *Purusha*, or spirit, who is untouched by afflictions, works, the result of works, or deserts; in whom the germ of omniscience reaches its extreme limit; who is the preceptor of even the first, because he is not limited by time; and whose appellation is Om, the term of glory.' This word is to be muttered, and its sense is to be reflected on, for from it come the knowledge of *Is'wara* and the prevention of 'the obstacles' which impede Yoga. These obstacles, *Patanjali* says, are 'illness, apathy, doubt, listlessness about the accomplishment of meditation, want of exertion, attachment to worldly objects, erroneous perception, failure to attain any stage of meditation, or inability to continue in the state of meditation when it has been reached.' There are several other methods to prevent these obstacles from distracting the mind and impeding its steadiness. One, e.g., consists in pondering over one single accepted truth; another in 'practicing benevolence, tenderness, complacency, and disregard toward all objects in possession of happiness or grief, virtue or vice; another, 'in forcibly expelling or retaining the breath;' another, in 'dwelling on knowledge that presents itself in dream or sleep;' etc. When all these modifications have disappeared, the mind becomes free from 'the tingeing' of the exterior world, as the pure crystal is free from the color that seems to belong to it, when a colored substance is seen athwart it. After having described

the various modes in which the mind may appear changed into the likeness of what it ponders, the author of this system then proceeds to explain the practical Yoga, by which 'concentration' may be attained. It comprises, according to him, mortification, the muttering of certain hymns, and a devoted reliance on the Lord. Through it, meditation is established, and *afflictions* are got rid of. By afflictions, again, he understands ignorance, egotism, affection, aversion, and tenacity of life; which terms are then the subject of an especial investigation into the nature of what is to be got rid of, of what is not desired to be got rid of, of what is constituted by the cause, and of what is the constitutive cause.—There are eight means or stages subservient to the attainment of concentration—viz., forbearance (*yama*), religious observance (*niyama*), postures (*āsana*), regulation of the breath (*prān'āyāma*), restraint of the senses (*pratyāhāra*), steadying of the mind (*dhāran'ā*), contemplation (*dhyāna*), and profound meditation (*samādhi*).—The first stage, *forbearance* (*yama*), consists in not doing injury to living beings, veracity, avoidance of theft, chastity, and non-acceptance of gifts; they are the universal great duty.—The second stage, *religious observance* (*niyama*), comprises purity—external as well as internal—contentment, austerity, muttering of the Vedic hymns, and devoted reliance on the Lord.—The third stage of Yoga, *postures* (*āsana*), is defined by Patanjali as 'that which is steady and comfortable' at the same time. The commentators mention several varieties of such postures. According to an interesting treatise on the Yoga philosophy by Navinachandrapāla, one of these, called *Siddhāsana*, is practiced by placing the left heel under the anus, and the right heel in front of the genitals, by fixing the sight upon the space between the eyebrows, and, while in this motionless attitude, meditating upon the mysterious syllable *Om* (q.v.). Of the posture called *Padmāsana* the same treatise says that it consists in placing the left foot upon the right thigh, and the right foot upon the left thigh, in holding with the right hand the right great toe, and with the left hand the left great toe, the hands coming from behind the back and crossing each other; while the chin rests on the interclavicular space, and the sight is fixed on the tip of the nose. When the command of such postures is attained, Patanjali says, the Yogin does not suffer either from cold or heat, hunger or thirst, or similar afflictions.—The fourth stage, *regulation of the breath* (*prān'āyāma*), is three-fold, according as it concerns exhalation or inhalation, or becomes tantamount to suspension of the breath, the latter also being termed *kumbhaka* [from *kumbha*, a jar], because 'the vital spirits then are as motionless as water is in a jar.' Through such a regulation of the breath, the obscuration of the pure quality of the mind is removed, and the latter becomes fit for acts of attention. Navinachandrapāla describes different processes of the Prān'āyāma, as selected from different authorities. One, for instance, consists, according to him, in the act of inhaling through the left nostril for 7·6788 seconds, suspending the breath for 30·7152



seconds, and exhaling through the right nostril for 15·3576 seconds; then inhaling through the right nostril for 30·7152 seconds, exhaling through the right nostril for 7·6788 seconds, suspending the breath for 30·7152 seconds, and exhaling through the left nostril for 15·3576 seconds; lastly, inhaling through the left nostril for 7·6788 seconds, suspending the breath for 30·7152 seconds, and exhaling through the right nostril for 15·3576 seconds. To the *kumbhaka*, of which there are eight varieties, the same author observes, two processes are indispensable: sitting in one of the postures described; and, by means of an incision in the *frænum linguæ*, and milking, as it were, the tongue, causing it gradually to become so lengthened as to allow the *rima glottidis* to be shut by pressing back the *epiglottis* with the point of the retroverted tongue. Such *kumbhakas*, it is supposed, produce the most wonderful effects: some of them cure diseases of the head and lungs, dropsy, etc.; others make proof against all sorts of inflammation and fever; the eighth or last variety of the *kumbhaka*, especially, cures all diseases, purges from all sins, promotes longevity, enlightens the mind, and awakens the soul.—The fifth stage of Yoga, the *restraint of the senses* (*pratyāhāra*), means the withholding of the senses from their respective objects, and the accommodating them entirely to the nature of the mind. According to an authority quoted by Navīnachandrapāla, a Yogin's senses are suspended when he can suspend the respiratory movements for 10 minutes and 48 seconds.—This stage is preparatory to the sixth, or the *steadying of the mind* (*dhāraṇā*), which means the freeing of the mind from any sensual disturbance, by fixing the thoughts on some part of the body—for instance, on the navel or the tip of the nose. This stage, it is supposed, can be accomplished when the Yogin is able to suspend his respiratory movements for 21 minutes and 36 seconds; and, according to Navīnachandrapāla, it is effected by different processes—muttering the syllable *Om* 144,000 times, fixing the eyes upon the tip of the nose, or the space between the eyebrows, for two hours, swallowing the tongue for two hours, etc.—*Contemplation* (*dhyāna*), the seventh stage of Yoga, is the fixing of the mind on the one object of knowledge, the Supreme Spirit, so as to exclude all other thoughts. It is practiced in consequence of the 'steadying of the mind,' as defined before; and, according to the authority quoted by Navīnachandrapāla, a man can accomplish it when he is able to suspend his respiratory movements for 43 minutes and 12 seconds.—The eighth and last stage of Yoga, *profound meditation* (*samādhi*), is the perfect absorption of thought into the one object of meditation, the Supreme Spirit; it is devoid, as it were, of any definite character which would suggest a term as applicable to it. In such a state, Navīnachandrapāla says, 'a Yogin is insensible to heat and cold, to pleasure and pain; he is insensible to blows and wounds, to the effects of fire; he is the same in prosperity and adversity; he enjoys an ecstatic condition. He is free from lust, fear, and anger; he is disengaged

from all works. He is not affected by honor and dishonor. He looks on gold, iron, and stones with the same unconcerned eyes. He is the same in love and in hatred; he is the same among friends and enemies.' And according to the authority which he quotes, such a state may be attained by a man who can suspend his respiratory movements for 1 hour 26 minutes and 24 seconds.—The last three stages are also comprised under one distinctive name, *Sam'yama*, or 'restraining,' because it is chiefly on the perfection attained in these three collectively that depend the wonderful results promised to a Yogin when he applies them to the contemplation of special objects. Such results are, e.g., knowledge of the past and future, knowledge of the sounds of all animals, of all that happened in one's former births, of the thoughts of others, of the time of one's own death, a knowledge of all that exists in the different worlds, of stars and planets, of the structure of one's own body, etc. There are especially, however, eight great powers which a Yogin will acquire when properly regulating and applying the *sam'yama*—viz., the power of shrinking into the form of the minutest atom; that of assuming a gigantic body; that of becoming extremely light; that of becoming extremely heavy; that of unlimited reach of the organs (as touching the moon with the tip of a finger); that of irresistible will; that of obtaining perfect dominion over the inner organs of the body; and that of acquiring mastery over everything. If the Yogin applies *sam'yama* to the contemplation of the smallest divisions of time, and the successive order in which such divisions occur, he obtains a discrimination which enables him to understand the subtle elements, and to see all objects at once. When his intellect has become free from all considerations of self, and his spirit is no longer subject to the result of acts performed, and when both have thus attained the same degree of purity, the Yogin obtains eternal liberation.—In the last chapter of his work, Patanjali then shows that these perfections are not always obtained by Yogins in one birth, but that *Prakr'iti*, or nature (see SÂNKHYA), generally in a succession of births, brings to maturity the result obtained in a prior birth. He thus makes nature, not actions, the cause of each effect; meritorious actions merely serving, according to him, to remove the obstructions which, from bad actions, would arise to its regular progress, just as water would take its natural course as soon as the husbandman, who would want to lead it from field to field, had removed the obstructions that lay in its path. After having then taught that the result of actions, in successive births, consists in the recollection of a prior state, and in the obtainment of a special existencé (a special duration of life, and special enjoyments), and after having discussed the different influences to which the mind may become subject in its union to different objects, Patanjali ends with describing the mode in which final liberation gradually takes place. First, he says, when a person has obtained the discrimination conveyed by the Yoga doctrine, all ideas of self—such as, I am different;



from another—cease. In consequence, thought is turned inward, and this is the beginning of liberation. But, as still recollections, derived from former existences, sometimes prevail in his mind, they must be abandoned by him in the same way as he has to overcome the afflictions, above specified. When he has succeeded in this, his knowledge will have become so infinite that but little will remain for him to learn. Then the cosmical *gun'as*, or qualities, too (see SÂNKHYA), having accomplished the main object of spirit, will have gradually arrived at the end of their functions, and, as a consequence, matter will become separated from spirit. This is *kaivalya*, or true liberation, for the mere power of the mind to retain its nature after dissolution has taken place, is not yet true liberation.—The practical part of the Yoga was admitted into the later Vedânta (q.v.). Its ethical portion is especially dwelt upon in the celebrated episode of the Mahâbhârata (q.v.), the *Bhagavadgîtâ*. But the great power which it has at all periods exercised on the Hindu mind is derived less from its philosophical speculations or its moral injunctions than from the wonderful effects which the Yoga practices are supposed to produce, and from the countenance that they give to the favorite tendency of orthodox Hinduism, the performance of austerities. Frequently these practices were and are merely a cloak for imposture and hypocrisy, and the professional Yogins (q.v.), numbers of whom are met with throughout India, are often nothing but lazy mendicants or jugglers, who, by impressing the vulgar with a belief in their supernatural powers, gain an easy livelihood. Such followers of the Yoga pretend, e.g., to foretell future events; they deal in palmistry, and profess to cure diseases: see SAIVAS. There are instances, too, where, for a handsome consideration, they allow themselves to be buried for a certain time, so as to exhibit the power of the Yoga. Two such cases are related as authentic in the treatise of Navînachandrapâla; and it appears from them that a human being, after having undergone certain preparations, such as the Yoga prescribes, may be shut up in a box without either food or drink for a month, or even 40 days and nights, and yet remain alive. The author of the treatise endeavors, indeed, to show that the rules laid down by the Yoga regarding the mode of respiration, the postures, and the diet of a Yogin, may have been founded on a careful observation of the nature and habits of hibernating animals; and in support of this view, he enters into a detailed investigation of the effect of the Yoga practices on animal life. If, as it seems, his statements are correct, much of what otherwise would be incredible in the accounts given of the performances of Yogins could be received as true, because possibly admitting of explanation. The system of *Patanjali* was taught by him in a little work called *Yogasûtra*, which consists of four Pâdas, or chapters, each comprising a number of Sûtras (q.v.). The oldest commentary on it is ascribed to a *Vyâsa* (q.v.); and this was commented on by *Vachaspati-Mis'ra*. Of other commentaries, those by *Vij-*

## YOGIN—YOKE-FOOTED BIRDS.

*nānabhikshu*, *Bhojadeva*, and *Nāgojibhat'ta* are the most approved.—For fuller enumeration of works on the Yoga, see *A Contribution toward an Index to the Bibliography of the Indian Philosophical Systems*, by Fitzedward Hall (Calcutta 1859). The first two chapters of the *Sûtras* have been translated, with annotations founded on the commentary of *Bhojadeva*, by the late J. R. Ballantyne (Allahabad 1853); and a paraphrase, somewhat too free, of the same commentary is contained in Vol. IV. of William Ward's *View of the History, Literature, and Religion of the Hindus, etc.* (4 vols. London 1817-20). For a brief account of the system, see also Vol. I. of H. T. Colebrooke's *Miscellaneous Essays* (2 vols. London 1837); and for the practice of the Yoga, *A Treatise on the Yoga Philosophy*—that referred to above—by N. C. Paul (i.e., Navinachandrapâla) (Benares 1851).

**YOGIN**, *yô'gîn*, or **YOGI**: follower of the Yoga system of Hindu philosophy (see **YOGA**); but in popular acceptation a term generally denoting a Hindu ascetic or devotee, a man who has entered the fourth stage of religious life as described in the *S'âstras*. A large class of such persons form a division of the votaries of *S'iva*: they profess to be descendants of men who by the practice of Yoga obtained supernatural power. They go about in India as fortune-tellers and conjurors.—See **SAIVAS**.

**YOICK**, n. *yô'îk*, or **YOICKS**, n. *yô'îks* [from the sound made]: an old hunting cry.

**YOKE**, n. *yôk* [Goth. *juk*; Icel. *ok*; Ger. *joch*; Russ. *igo*; Lith. *jungas*; L. *jugum*; Skr. *yuga*; Gr. *zugon*, a yoke]: a curved wooden collar by which a pair of oxen are fastened together for the purpose of drawing a plow, wagon, or the like; a light bar of wood with straps and hooks at the ends, placed over the shoulders for carrying water-buckets, milk-pails, or the like: a piece of wood with two arms placed over the head of a boat's rudder instead of a tiller, and having two lines, by pulling which the boat is steered; a plain ungathered part of a garment, of double thickness, fitted to the part of the body to be covered (as the shoulders, in a shirt or basque, and the hips, in a skirt), and to which the 'fulness' or depending part is fastened; a mark or state of servitude; bondage; any bond or connection; a couple or pair, as of oxen; chain; link; in *Scrip.*, service: V. to put a yoke on; to couple; to restrain; to enslave. **YO'KING**, imp.: N. the act of coupling or joining; the harnessing and hitching up of draft-animals, as horses; in *Scot.*, one of the two divisions of the day during which a horse plows, as from morning to dinner-time (noon), or from dinner-time to six o'clock; in *mining*, pieces of wood used for designating possessions. **YOKED**, pp. *yôkt*. **YOKE-FELLOW**, or **YOKE'MATE**, a companion in servitude or labor; a partner. **YOKEL**, n. *yô'kl*, a rustic.

**YOKE'-FOOTED BIRDS** (*Zygodactylus*): see **CLIMBERS**.



## YOKOHAMA.

YOKOHAMA, *yō-kō-hā'mā* ('Cross Strand'): seaport of Japan; on the s. side of a bight of the Gulf of Yedo; 15 m. s. of Tokio; prefecture of Kanagawa, and opposite to Kanagawa, the town designated in the treaties as the open port; lat.  $35^{\circ} 26' 11''$  n., long.  $139^{\circ} 39' 20''$  e.; in the east of the main island commonly but erroneously called Nippon. Prior to 1859 Y. was only a small fishing-village, but rose into importance when Kanagawa was found inconvenient for a treaty-port owing to its position on the Tokaido, or great highway from Yedo to the south. Collisions were frequent between foreigners and the two-sworded retainers of the Daimios who were continually passing to and from the capital, and for the safety of foreigners it was decided to move the foreign settlement to the opposite shore. A stone causeway 2 m. long across the swamps to the new settlement was built by the Japanese govt.; piers (or *hatobas*) of solid granite were constructed; a large custom-house, official residences, houses and godowns (warehouses) for the merchants were erected, and everything done by the govt. to induce foreigners to acquiesce in the change. The change was made 1859. Later the prefectural offices of the ken or prefecture of Kanagawa also were moved to Y. The town proper stands on a plain not more than 10 or 12 ft. above sea-level, and extends along the shore about  $1\frac{1}{2}$  m., surrounded on two sides by a canal. The custom-house is nearly in the centre of the town; and e. and w. of it lie respectively the foreign settlement and the native town. The other noteworthy buildings in the neighborhood are the *kencho* (prefectural offices), the *saï-ban-sho* or court-house, the post-office, the U. S. and Brit. consulates, etc. The streets are curbed, well paved, and clean. The native shops are filled with goods to suit the foreign taste—such as lacquered ware of rare quality and bronze-work, baskets and porcelain, fancy silks and embroidery, curiosities and articles of *vertu*. There are no docks or wharves, all goods being loaded and unloaded from lighters. Extensive harbor-works, however, are projected by the Japanese govt., to include two breakwaters, with total length of 12,082 ft., inclosing a space of 2.01 sq. m., and an iron pier on screw-piles, carried out 1,980 ft. from the landing-place, with lines of railway leading from the pier-head to the custom-house, and thence to the railway system of the country. A dock company with a capital of three million *yen* has been incorporated. Gas was introduced into the native town and foreign settlement 1872, and in the same year a railway to Tokio was opened. More recently this railway has been extended w. down the Tokaido. Y. has 3 daily and 1 weekly newspapers in English, and 1 French daily. There are 3 churches—Anglican, Rom. Cath., and Union; and several native places of worship (the largest of which, near the English *hatoba* or landing, is used by the Union Church). Three foreign banks have important agencies here, and there are several native banks and banking houses. Japanese, however, are not permitted to open places of business or reside in the

foreign settlement, and foreigners are similarly restricted as regards the native town.

Y. is the commercial centre of Japan. It is a port of call of the three great Transpacific lines between Hong-kong and San Francisco and Vancouver; and has regular weekly communication with both Hong-kong and Shanghai by several other lines, native and foreign. The chief exports are tea, silk (raw and manufactured), lacquer-ware, porcelain, bronzes, etc. The chief imports are yarns, cotton and woolen goods, metals, machinery, etc.

S. and w. of the foreign settlement is a range of low well-wooded hills (about 150 ft.), called the 'Bluff,' on which since 1869, and by the courtesy of the Japanese govt., foreigners have been permitted to lease land, and to erect villas and cottages for private residences—a privilege which has been largely availed of in consequence of the lack of good drinking-water in the settlement proper, and its general unhealthfulness. In the immediate vicinity of Y. is the village of Ota, noted for its potteries; and about 15 m. down the coast is the port of Yokosuka, where are a Japanese arsenal and a navy-yard.

Until 1875 both the British and the French maintained bodies of troops at Y. for protection of the settlement.—Pop. (1898) 193,762, including about 2,200 foreigners, of whom more than half are Chinese.

YOLK, n. *yōk* [AS. *geoleca*, the yolk—from *geolu*, yellow (see YELLOW)]: the yellow part of an egg; the vitellus (see EGG: VITELLUS); the oily secretion from the skin of a sheep which renders the wool soft and pliable.

YON, a. *yōn* [AS. *geon*, yon: Goth. *jains*, yon, that: Ger. *jener*, that]: that or those, referring to some object or objects at a distance but within view; yonder. YOND, a. or ad. in *OE.*, yonder.

YOND, a. *yōnd*: in *OE.*, mad; furious.

YONDER, a. *yōn'der*: that or those: referring to an object or objects at a distance but within view: AD. at or in that place; there.

YONGE, *yŭng*, CHARLOTTE MARY: English novelist: b. 1823; only daughter of a Hampshire country-gentleman. The work by which she is best known is *The Heir of Redclyffe*, which had great success and has gone through several editions. Besides this she is the author of *Heart's Ease*, *Dynevor Terrace*, *The Daisy Chain*, *The Lances of Lynwood*, *The Little Duke*, etc. These works show much literary accomplishment, and are pervaded by an amiable and pious spirit; and have secured for Miss Y. a public of her own. They are commonly vehicles of the writer's high-church opinions. Considerable sums accruing from the sale of her writings it is said she devoted to the aid of religious missions in New Zealand. In addition to the fictions by which she was chiefly known, Miss Y. also published a work *On Christian Names, Their History and Derivation*, in which much curious erudition is displayed; *Life of Bishop Patteson* (1873); etc. She d. 1901, Mar. 24.



## YONI—YONNE.

YONI, n. *yō'nī*: the Hindu name for the female power in nature, represented by an oval.

YONKERS, *yōngk'érz*: city in Westchester co., N. Y.; on the Hudson river, and on the New York Central and Hudson River railroad; adjoining New York, and 16 m. from its city hall. Its site is a series of hills, between which flows the Nepperhan river, which provides excellent water-power for several important manufactories. Hudson river steamboats make regular stops here, and the city is connected with New York by commercial and police telegraph, and telephone. It is one of the most picturesque residential places on the river, and besides containing many costly homes of New York business men has numerous hotels and boarding-houses for summer denizens. The city is lighted with electricity, and has efficient water, sewerage, police, fire, sanitary, and municipal services. In 1900 there were 25 churches (Meth. Episc. 5, Prot. Episc. 4, Presb. 4, Rom. Cath. 4, Bapt. 3 and African Meth. Episc. Zion, Unit., Ref., Ger. Evang. Luth., etc.); 1 high and 7 grammar and primary schools; 2 national banks (cap. \$250,000), and 2 savings banks (surplus \$222,251); and 2 daily and 3 weekly newspapers. The notable buildings in Y. and vicinity are the old Philipse manor-house (built 1752, now the city hall); Samuel J. Tilden's 'Greystone' residence; the Edwin Forrest 'Castle;' Mother-house of the Sisters of Charity (Rom. Cath.), with 1,051 members of the community; Mount St. Vincent's Acad. (Rom. Cath.), with 23 sisters, 6 lay teachers, and 211 pupils; and a large Hebrew Home. Y. is widely known for the extent and variety of its manufactures, which include carpets, hats, hatting machinery, plows, elevators, morocco, wool, yarn, silk goods, lead-pencils, barrels, agricultural implements, rubber goods, sugar, glue, machinists' and plumbers' tools, pickles, shirts, carriages, and beer. Mr. Tilden, in his will, made liberal provision for a public library and reading-room for Y., distinct from the clause relating to the projected public library in New York which the courts declared void.—Pop. (1880 18,892; (1890) 32,033; (1900) 47,931.

YONNE, *yonn*: department in n.e. France, bounded n. by the dept. of Seine-et-Marne, e. by Aube and Côte-d'Or, s. by Nièvre, w. by Loiret; 2,860 sq. m. The dept. is watered by the river Yonne, which flows n.e. across it. The surface is hilly, many of the hills being covered with fruitful vineyards, the intervening valleys being beautiful and fertile. The vineyards yield annually more than 22,000,000 gallons of wine. There are some fine forests. The climate is generally healthful, except in the s.w., where the marshes often give rise to fever. The soil produces abundance of grain, but the cultivation of the vine is of chief importance, the best wines produced here being those of Chablis, Joigny, Auxerre, and Tonnerre. The chief mineral products are red granite, marble, lithographic stones, pavement, red and yellow ochre, iron. There are manufactures of cottons, woolens, beet-root sugar, bricks, tiles, etc. The chief exports are timber, corn, and wine. Y. is divided

## YORE—YORK.

into five *arrondissements*—Auxerre, Avallon, Joigny, Sens, Tonnerre. The railway from Paris to Lyon passes through the dept. The cap. is Auxerre; other chief towns are Avallon, Joigny, Sens, and Tonnerre.—Pop. (1881) 357,029; (1886) 355,364; (1891) 344,688; (1901) 321,062.

YORE, ad. *yōr* [AS. *geara*, formerly—from *gear*, a *year*]: in *OE.*, anciently; long ago; in times past; now used only in the phrase OF YORE, of olden time; long ago.

YORITOMO, *yō-rī-tō'mō*: Japanese warrior and statesman: 1146–99; third son of Minamoto Yoshitomo, great-grandson of Tsunemoto, founder of the Gen or Minamoto family, an offshoot of the royal house, rivals of another great military family named Hei or Taira, also an offshoot from the royal house. Y. is noted in Japan for his part in crushing the Taira, who had murdered his father and sworn to annihilate his family, and in establishing the ascendancy of the Minamoto family in the government of the state. In 1192 he was created *Sei-i-tai-shogun*, 'barbarian-subduing-great-general' (see SHOGUN), and both the title and the office were made hereditary in his family. At this time began that dual government which culminated with the Tokugawas (a branch of the Minamotos), and came to an end 1868, when the shogunate was abolished, the emperor undertook to rule in person, and Japan entered on the career of progress which has since distinguished her. Yoritomo, however, was not a usurper, as were many of his successors, but took care to do nothing without direct sanction of the mikado. He did much for elevation of the people, improvement of agriculture, and promotion of justice and personal security. He established his capital at Kamakura (about 18 m. s.w. of Yokohama), where he died in consequence of a fall from his horse, at the age of 53. Kamakura continued to be the seat of the shoguns until the founding of Yedo (see TOKIO).

YORK, v. *yawrk*: in *cricket*, to fowl with a yorker. YORK'ER, n. *-ēr* [probably from its being used first by a Yorkshire player]: in *cricket*, a ball bowled so as to pitch very close up to the bat.

YORK, *yawrk*: city, cap. of York co., Neb.; on a branch of the Big Blue river; and on the Burlington and Missouri, the Fremont Elkhorn and Missouri Valley, and the St. Joseph and Grand Island railroads; 52 m. w. of Lincoln. It is the seat of a Meth. Episc. college with 220 pupils.—Pop. (1880) 1,259; (1890) 3,405; (1900) 5,132.



## YORK.

**YORK:** city, cap. of York co., Penn.; on the Codorus creek; and on the Pennsylvania, the Northern Central, and the Baltimore and Lehigh railroads; 26 m. s. of Harrisburg, 57 m. n. of Baltimore, 94 m. w. of Philadelphia. It is a thrifty commercial and manufacturing city in a remarkably fertile agricultural region. In 1900 it contained 40 churches; 20 public schools of all grades; a Collegiate Institute; the York Co. Acad.; a Young Ladies' Seminary; public library; 6 national banks (cap. \$1,500,000), 2 private banks, 1 state bank, and 1 incorporated bank; and 4 daily, 7 weekly, and 7 monthly periodicals. The city is lighted by electricity and supplied with water from the Codorus; is in telegraph and telephone connection with its suburbs and distant cities; has a street railroad; and, since the disastrous flood of 1884, the streets have been regraded, macadamized, and lined with trees, and the Codorus has been spanned by seven iron and one wooden bridges. Among notable buildings are the courthouse, jail, almshouse, opera-house, Orphan Home, High School, Collegiate Institute; and the Eastern, Western, and City markets. The manufactures of Y., which yield annual products valued at about \$3,500,000, include agricultural implements, foundry and machine-shop products, railroad cars, engines and boilers, boots and shoes, cigars, organs, scales, locks, safes, tanned leather, and bricks. Y. was settled 1741; was the seat of the congress while Philadelphia was occupied by the British 1777-8; and was incorporated 1787.—Pop. (1890) 20,793; (1900) 33,654.

**YORK:** city, cap. of Yorkshire, England; at the junction of the rivers Ouse and Foss, the three Ridings of the county meeting at the same place; and is nearly equidistant from London and Edinburgh (188 m. from London). It is the seat of an archbishopric, a county in itself, and a municipal and parliamentary borough. The govt. is vested in 12 aldermen and 36 councilors, of whom one, as in the case of London, is lord mayor. Under the new territorial army organization, 1876, Y. is the centre of the northern milit. dist., a general officer's command.

Y. is one of the most ancient of British cities. Before the Roman invasion it was one of the chief towns of the Brigantes, the most numerous and powerful of the British tribes. It was constituted a Roman station under the name *Eboracum*, by Agricola about A.D. 79, and was very soon the principal seat of Roman power in the north, perhaps in all Britain. While the Roman dominion existed in the island, Y. was a city of the first importance. Here Hadrian lived and Severus died. Here, too, died Constantine Chlorus, father of Constantine the Great, and here, as many believe, Constantine the Great was born. When the emperors visited the province, Y. was their chosen residence, and it was the abode of the imperial legates when the emperors were absent. Little is known of the city for a century after the departure of the Romans, about 409; but it certainly suffered much during the long conflict between the Britons and the Picts, against whose incursions Y. was a material defense. It afterward be-

came the cap. of Northumbria. The first metropolitan church in England was built here by Edwin, the Northumbrian king whom Paulinus baptized; here also Edgar, the first sole monarch of England, held 966 the Witenagemot. William the Conqueror was long unable to overcome this stronghold of the north, notwithstanding his coronation by its abp., Aldred. One Norman garrison, numbering 3,000 men, was put to the sword 1069; but William exacted a terrible vengeance in the following year, when he laid waste the whole country between Y. and Durham.

The first English parliament was held at Y. 1160 by Henry II., and for 500 years afterward parliaments were summoned occasionally to the ancient city. Under Henry III., the courts of king's bench and exchequer sat at Y. for seven years; and for a few months Richard II. removed thither the courts of king's bench and chancery. During the insurrections consequent on the dissolution of the monasteries by Henry VIII., Y. was seized by the insurgents of the 'Pilgrimage of Grace;' and in its immediate neighborhood Fairfax, 1644, conquered Prince Rupert on Marston Moor. The city and castle, already besieged, surrendered to the parliamentarians a few weeks later. The Brit. Assoc. was organized at Y. 1831, and here the jubilee meeting was held 1881.

A city so ancient necessarily presents many interesting memorials of antiquity. There are remains or memorials of Roman towers and temples, and of the earliest British churches. One of the most magnificent of the Anglo-Saxon churches was erected at Y. in the 8th c., and this, destroyed by fire, rebuilt, enlarged, and changed from time to time, is now known as York Miuster. A portion of the original church was disinterred during the excavations which followed the burning of the minster 1829. The present structure of this Cathedral of St. Peter is as a whole the most imposing work of ecclesiastical architecture in England, and takes rank with the finest specimens of Gothic architecture in the world. It was built mainly in the 13th and 14th c., and represents the designs of successive architects. Its length, from base to base of the buttresses, is 524 ft., and its extreme breadth 250 ft., being 24 ft. longer than St. Paul's Cathedral, and 149 ft. longer than Westminster Abbey. The magnificent east window is 75 ft. high and 32 ft. broad, and contains about 200 compartments, each a yard square, representing scriptural subjects. The view across the great transept is very impressive. War and fire have conspired to deform or destroy this splendid cathedral. Twice it has been burned down, 1069 and 1137, each time to rise more beautiful than before. During the times of the Commonwealth, much damage was done by war and wantonness, and several of its older monuments were mutilated or broken. In 1829 it was set on fire by Jonathan Martin, a maniac; and the roof of the choir, 222 ft. long, with all the woodwork on each side, was destroyed. While this disaster was being repaired, a workman's candle was carelessly left burning, one night in 1840, and again a terrible fire broke out, destroying the



## YORK.

s.w. tower, with its splendid peal of bells, and the roof of the nave. The cost of the repairs exceeded £100,000.

A monastery of Benedictine monks was built, or rather completed, at Y. in the time of William Rufus, which was in great part reconstructed about the end of the 13th c. Its abbot had a mitre and a seat in parliament. Some portions of the original building yet remain. Thirteen seceders from this monastery established 1131 the neighboring Abbey of Fountains, near Ripon, under Cistercian rule. On the site of the Benedictine monastery now stand the museum and gardens of the Yorkshire Philosophical Soc. The same order had a priory dedicated to the Holy Trinity in Micklegate, and a nunnery outside the walls at Clementthorp. Besides these, the Dominicans, Franciscans, Augustinians, and Carmelites had each a monastery, and the Gilbertines a priory, within the city. In the immediate neighborhood were 16 hospitals. At the Reformation, Y. contained 41 parish churches, 17 chapels, 16 hospitals, and 10 religious houses. 22 of the churches yet remain, and several new churches have been built. The Rom. Catholics have a fine pro-cathedral. There are many places of worship for dissenters.

The educational institutions of Y. are numerous and useful. Notable among them are St Peter's School, founded 1557; Abp. Holgate's Free School, dating from the time of Henry VIII.; the Blue Coat School for boys, and the Gray Coat for girls, supported chiefly by annual subscriptions; and the Yorkshire School for the Blind, conducted in a palace built originally for the lord pres. of the Council of the North. Y. publishes one daily and three weekly newspapers. The building erected for a fine-art exhibition 1879 contains a concert-hall and picture-galleries. The Yorkshire Philosophical Soc., formed 1822, has a handsome building and gardens on the site of St. Mary's Abbey, with a museum, rich in antiquarian relics and specimens illustrative of natural history. Among public institutions are the County Hospital, the first in England n. of the Trent; the Lunatic Asylum; the Dispensary; and the Friends' Retreat. The ancient castle, except its imposing Clifford's Tower, is superseded by the modern and commodious assize courts. The Guildhall, a fine Gothic building, was erected 1446.

Whatever the trade of York may have been in ancient times—and old writers speak of it in glowing terms—it is small now. The making of leathern gloves, combs, glass, etc., supplies employment to many; there are iron-foundries, flax-spinning, and manufacture of linen; and of late the construction of railway cars has become an industry.—The area of the city was enlarged 1884 from 1,979 acres to about 3,550 acres. Pop. (1871) 43,796; (1881) 49,530; (1891) 66,984; (1901) 77,793.

See Drake's *Eboracum*; Browne's *History of the Metropolitan Church of St. Peter's, York*; Britton's *Cathedral Antiquities—York*; Hargrave's *History of York*; Gent's *York*; Wellbeloved's *Eburacum, or York under the Romans*.

## YORK—YORKIST.

YORK, HENRY BENEDICT MARY, Duke of, Cardinal, and Bishop of Frascati: last male descendant of the royal House of Stuart: 1725, Mar. 26--1807, July 17; b. Rome; second son of James (III. of England), commonly known as the Pretender. Y., after the failure of the attempt of his elder brother, Charles Edward, 1745, resolved to enter the priesthood. He was admitted to tonsure and minor orders by Benedict XIV., and created cardinal 1747. Clement XIII. consecrated him bp. of Corinth *in partibus infidelium*, and afterward of the suburban see of Frascati, where he made his residence. He received also, through the favor of the crown of France, the revenues of two abbeys, which he held *in commendam*, as well as a pension from the Spanish court; and the liberal charity with which he dispensed his income among the poor, and for the various religious necessities of his diocese, endeared him to his flock. These resources were lost at the revolution; nevertheless, in the distresses of the holy see which ensued, Cardinal Y. sold his family jewels for the purpose of relieving Pius VI. in his necessities. On the occupation of Rome, he withdrew to Venice; but returned 1801, on the restoration of the papal authority under Pius VII. George III., having become aware of the failure of his former means of income, granted him a pension of £4,000 a year, which he received till his death. Those to whom a printed record of the 'last of the Stuarts' may be interesting, will find a small collection of his 'Pastoral Letters' in a 4to volume published in Rome, entitled *Appendix ad Tusculanam Synodum a Celsitudine Regia Eminentissimi Henrici Episcopi Tusculani* (Rome 1764). He was appointed by Pius VII. dean of the Sacred College, and held several other dignities, and was much respected by the Italians and by foreigners visiting Rome. He died at Frascati. His last will, an interesting document, is printed by Artaud in his *Vie de Pie VII.* His monument, by Canova, in St. Peter's, was erected by order of the prince regent, afterward George IV.

YORK, HOUSE OF: see PLANTAGENET.

YORK RIVER: stream in Va., formed by the union of the Pamunkey and Mattaponi, flowing s.e. to Chesapeake Bay, nearly opposite Cape Charles. It is 40 m. long, and 1 to 3 m. wide, Yorktown (q.v.), an ancient but decayed port, is on the right bank, 10 m. from its mouth.

YORKIST, n.: in *Eng. hist.*, an adherent of Edward, Duke of York, afterward Edward IV., King of England. The emblem of the Yorkists was a white rose: see ROSES, WAR OF THE.



## YORKSHIRE.

**YORKSHIRE**, *yawrk'shēr*: a n. county of England, larger in territorial extent than any other two counties; nearly in the centre of Great Britain, about midway between London and Edinburgh; bounded n. by the county palatine of Durham, from which it is separated by the river Tees; e. by the German Ocean, from the mouth of the Tees to the entrance of the Humber; s. by Lincolnshire, from which it is divided by the rivers Humber and Trent. The boundaries between Y. and the counties of Nottingham, Derby, Cheshire, Lancashire, and Westmoreland are merely conventional, being indicated by no natural feature of the country. The longest diagonal of the county, n.w. to s.e., extends about 130 m.; the shortest, s.w. to n.e., about 90 m.; area about 6,067 sq. m., or 3,882,851 acres—about one-eighth of the surface of England. It is divided into three Ridings, North, East, and West, and a small district not included in any of the three, the Ainsty of York. The Ridings (a corruption of tri-thing or thirling) date back to Saxon times, and are peculiar to Yorkshire. Each has a separate military and civil jurisdiction, and each its own lord lieut. and public buildings. The N. Riding contains 11 wapentakes; the E. 6; the W. 9. In the whole county, besides the archiepiscopal city, there are 59 market-towns and 1,639 parishes, townships, and places.—Pop. (1801) 658,892; (1871) 2,436,355; (1881) 2,886,564—three-fourths resident in the W. Riding; (1881) 2,175,314; (1901) 1,891,726.

The history of the county in early times may be mainly read in that of its chief city. Apart from the events at and in connection with York, there is little to be recorded. Y. was occupied originally by the Brigantes, and was subjected by the Romans under Agricola about A.D. 71. When the Roman occupation ceased, it was long and greatly troubled, first by Pictish, then by Saxon incursions. Under Saxon rule the traces of Brigantian occupancy were soon obliterated, only the rivers, mountains, and a few remarkable natural curiosities retaining their British names, while all things else received Saxon designations. The county formed part of the kingdom of Northumbria, taking the name of Deira (Country of Deer) when that kingdom was divided. In the troublous times which preceded the Conquest, many battles were fought against invading Danes, and generally with success. At Stamford Brig, a few miles from York, Harold, the last of the Anglo-Saxon kings, defeated the united Danish and Norwegian armies, three weeks before he fell before the Normans on the fatal field of Hastings. Among notable events of later history are the battle of Wakefield, where the Duke of York was defeated by Queen Margaret 1460; the battle of Towton Field, near Tadcaster, on Palm Sunday 1461, the most sanguinary conflict of the bitter war between the rival Roses; and the battle of Marston Moor, which gave the final blow to the falling fortunes of Charles I. Since that time, with slight exceptions, the history of Y. has been one of peace and prosperity.

The surface of the county is greatly diversified, On its

## YORKSHIRE.

n.w. border is a range of lofty hills, many of them containing extensive caverns, and giving rise to wild and romantic streams. Here is Ingleborough, 2,361 ft. above sea-level, with its cave half a mile long, full of beautiful stalactites; Whernside, 2,384 ft. high, with its subterranean cataract of 75 ft. in Weathercote Cavern; and Mickel Fell, 2,600 ft., which overlooks the waters of the Tees and Lune. Eastward, far away, rise the Hambleton and Cleveland Hills. Lower down are the Wolds, a line of chalk hills stretching from Flamborough Head to Ferriby, on the Humber. The hills and dales of Craven, which cover a large tract in the w., abound in natural beauty. Through the centre of the county, from the Tees to the Humber, lies the great Vale of York. Across its n. border flows the Tees. Southward are the dales of the Swale, the Ure, the Nidd, the Wharfe, the Aire, the Calder, and the Don, all on the w. side of the county, each sending a river to the central vale, where the united waters, with the Derwent and a few smaller tributaries from the e., form the Ouse; while the Ouse, after uniting with the Trent, becomes the Humber estuary, which rolls eight-tenths of the Y. waters to the sea. The Ribble, rising in Craven, passes by Preston, and falls into the Irish Channel, and is the only Y. river which finds a w. outlet. The Esk joins the German Ocean at Whitby, and the Tees between Redcar and Hartlepool.

Geologically, Y. is a large subject. The vale of Y., rarely more than 100 ft. above the sea, has on its w. side the long slow elevations which culminate in the Pennine chain, while on the e. rise the lower but more sudden eminences of the Wolds and the high grounds of Hambleton and Cleveland. On the w. are the millstone grit and mountain limestone, the two coming together in lofty opposing eminences in many parts of Craven, where, along the line of what is called by geologists the 'Craven Fault,' the limestone rises into magnificent cliffs many hundreds of ft. in height, and nearly 2,000 ft. above sea-level. The limestone is in many places very rich in lead ore. On the e. lie the Chalk Wolds and the Oolitic and Lias formations, with the Kimmeridge Clay of the Vale of Pickering, and the accumulations of sand, gravel, and other sediments which make up Holderness. In the s.w. district is a splendid coal-field, intermixed with ironstone, extending over 600 sq. m. Valuable deposits of iron ore have been discovered recently in the n.e. part.

In the n.w., the lower parts of the N. Riding, Craven, and the E. Riding, the land mainly gives occupation to the inhabitants. Craven is a grazing district, and so are most of the upper lands and dales in the county. Excellent grain is grown in the vales of York and Cleveland, and the E. Riding has many large and excellent farms. The horses of Y., both for the race-course and for use, are well known. The manufactures of the county are immense. Leeds is the centre of the woollen, as Bradford is of the worsted trade. Sheffield is the principal seat of the cutlery manufacture; while the Cleveland district is rapid-



## YORKSHIRE.

ly rising in mineral wealth and enterprise. There are large iron-works at Low Moor, Bowling, and Rotherham, and flax and linen manufactures at Leeds and Barnsley; blankets and cloths are made in the Huddersfield district, and the llama and alpaca industries have been introduced at Saltaire, near Bingley, by Sir Titus Salt (q.v.). Harrogate, Ilkley, Askern, and Croft are the principal inland health-resorts of the county; Scarborough, Filey, Bridlington, and Whitby take the lead on the coast.

The public works of Y. rank with the finest in the kingdom. Among them are the Aire and Calder Navigation, 15 m. long; the Calder and Hebble Navigation; the navigation of the Don and Sheffield region, 40 m.; and the Huddersfield canal, one of the most surprising engineering works in England. This canal is 20 m. long, and rises between Huddersfield and Marsden by 42 locks to the height of 656 ft. At this elevation, the highest canal-level in the country, it passes by a tunnel more than 3 m. long under Standedge, a range of hills between Marsden and Saddleworth. The canal terminates near Dukinfield. The Leeds and Liverpool canal cost 46 years of labor, and is 129 m. long. There are many smaller but very costly undertakings. The railway communications are excellent; on these lines, by reason of the mountainous districts through which many of them pass, are some of the longest and most difficult tunnels, viaducts, bridges, embankments, and cuttings yet attempted by engineers in England.

Traces of great Roman roads are found in many places, as well as of Roman, Saxon, and Danish encampments. In the Wolds are many tumuli; and it is supposed by some that the singular and imposing mass of rocks called Brimham Crag, which overlook Nidderdale, about 4 m. from Pateley Bridge, was anciently a Druidical temple. The ruins of ancient abbeys and priories are numerous and beautiful. Few can rival the glories of Fountains and Rievaulx, and the scenery around Bolton Priory is delightful. Besides these there are the ruins of Kirkstall, Roche, and Selby in the W. Riding; St. Mary's at York; Jervaux, Byland, and Whitby in the N. Riding; and many others. Of castles there are, in the W. Riding, Conisborough Castle, near Doncaster, one of the oldest and most interesting ruins known to antiquaries; Knaresborough, Pontefract, and Skipton, the last still used as a residence; in the N. Riding, Richmond, with its unrivalled Norman keep; Middleham Castle, where the king-maker Warwick lived, and where Edward IV. was immured, and Bolton Castle, prison for a time of Mary Queen of Scots; in the E. Riding, Wressle Castle, once the home of the Percies. Of old York Castle, nothing remains but Clifford's Tower.

The lover of the picturesque will find the Y. scenery full of charms. The rapid of Caldron Snout, on the Tees, 200 ft. in descent; High Force, on the same river, a perpendicular fall of 69 ft. over a cliff of greenstone marble; Aysgarth Force and Hardraw Force, on the Ure; the Strid, immortalized by Wordsworth, in Bolton Woods on Wharfe; the magnificent Gordale Scar and Malham Cove,

## YORKSHIRE-FLAGS—YORKTOWN.

each nearly 300 ft. in height, on the upper waters of the Aire; and the uncounted glens and streams among its myriad hills, indicate the attractions of its river and mountain aspects.—See Allen's *History of the County of York*; Whitaker's *Histories of Richmondshire, Craven, and Leeds*; Hunter's *Hallamshire*; Gent's *York, Ripon, etc.*; Phillips's *Geology of Yorkshire, and Rivers, Mountains, and Sea-coasts of Yorkshire*.

YORKSHIRE-FLAGS, n. plu. [from *Yorkshire* co., England]; building flags, of Carboniferous age; brought for building purposes from Halifax, Bradford, and Roehdale in Yorkshire. They readily absorb water, and are apt to flake when placed in damp situations. YORKSHIRE-GRIT, n., a peculiar kind of stone used for polishing marble, as also engravers' copper plates. YORKSHIRE-PUD'DING, n. a batter-pudding baked under meat.

YORKTOWN, SIEGES OF: a siege in the war of the revolution, and in the war of secession. Yorktown is cap. of Yorktown co., Va., and a port of entry, 10 m. from the mouth of the York river: pop. about 1,000. It has a Prot. Episc. and two Bapt. churches.—It is memorable for the surrender of Lord Cornwallis, which practically brought the revolutionary war to a close. In 1781, Aug. 1, Lord Cornwallis took possession of the village, with 8,000 men, supported by frigates and small vessels in the York river. He fortified himself with redoubts, batteries, a line of intrenchments, besides outworks, also works at Gloucester Point, across the river. In Sep. Gen. Washington, who had caused the British in New York to believe that he intended to attack that city, hastened his forces by land and water, numbering 9,000, and, joining at Williamsburg 7,000 French troops under Lafayette, from the fleet under Count de Grasse, invested Yorktown. The rapid strategic movement and the presence of the French blockading fleet prevented British reinforcements from New York. The investment was completed Sep. 30. The first parallel was established Oct. 9, and the batteries opened with effect not only on the enemy's works, but also, the following night, destroying a frigate and several transports. The second parallel was begun on the night of the 11th; and on the 14th, two enfilading redoubts were taken, one by American troops under Col. Hamilton, the other by the French. On the 16th the British made a sortie in vain. The next day Lord Cornwallis offered to capitulate, and on the 19th surrendered 7,247 regulars, 840 sailors, and 235 guns.

The second siege of Yorktown was in 1862. Early in the spring Gen. Magruder had posted himself there with about 15,000 Confederates. Gen. McClellan, then commanding the Army of the Potomac, with 112,000 men, and with Richmond as the objective point, invested Gen. Magruder, who was superseded in command by Gen. Johnston, and the Confederate force increased to 53,000. The siege was begun Apr. 5, and the batteries were to be opened May 6; but Gen. Johnston quietly evacuated two days previously.



## YORNUT—YOSEMITE VALLEY.

YORNUT, n. *yör'nüt* [Dan. *jordnöd*, the earthnut]: in bot., *Bunium flexuosum*; the same as EARTHNUT.

YORUBA, *yor'ū-bá*, or YARIBA, *yār'ī-bá*: country of w. Africa; 6°–9° n. lat., 3°–7° e. long.; formerly the whole region of the Y. tribes and language, from the Bight of Benin n. toward Borgu, and e. from Dahomey to the Niger and its delta—about 40,000 sq. m.; but since the Fulah invasion 1821 reduced by the transfer of its n. part to the Fulah state of Gando. The region is described as an elevated, sloping, cultivated plain in the n., and as undulating in the s.—both portions alike abundant in crops and in beautiful flowering trees and shrubs, giving the country the aspect of a garden, though the s. part gradually sinks toward the coast and becomes covered with dense primeval forest. Along the coast a great navigable stretch of sheltered water is inclosed in the coast-lagoons between the outer and the inner shores: into these lagoons the chief rivers discharge with sluggish current. Lagos, on the coast, is occupied by the British, and from this point they exercise a general control over the Y. region. There are a number of kingdoms or chieftaincies, and 10 or 12 great cities (pop. ranging from 40,000 to 150,000 each), or rather clusters of rudely walled towns, of which one of the chief is Abeokuta (q.v.). Many of these cities have originated in recent times by the gathering of the people together for mutual protection from the slave-hunters who have long ravaged this region.—The people are of a negro type somewhat less pronounced than their neighbors in Dahomey: they practice agriculture and some of the useful arts; and are distinguished above all the surrounding races for their peaceable, industrious, and hospitable disposition; also for their susceptibility to the influences of Christianity.—Pop. of the whole Y. Land estimated more than 2,000,000.

YOSEMITE VAL'LEY, *yō-sēm'ī-tē*: cleft in the w. slope of the Sierra Nevada, in Mariposa co., near the centre of Cal.; about 155 m. s. of e. of San Francisco. The name Y. is an Indian word meaning 'large grizzly bear.' This celebrated valley, noted for the sublimity and beauty of its scenery, is about 6 m. long and half a mile to a mile in breadth, and has the peculiarity of being sunk about a mile below the level of the surrounding country, though it is nearly 4,000 ft. above sea-level. The visitor is awed by the massiveness of its mountain elevations, the nearly perpendicular walls which shut it in throughout its entire length, and the grandeur of its waterfalls, in some respects the most remarkable in the world. The valley, traversed by the winding Merced river, has in its lower portion the appearance of a vast flower-garden, with plants, shrubs, and flowers of every hue. Of its world-famous falls, the Bridal Veil—so named because the column of water forming the fall seems to flutter in the wind like a veil—leaps at one bound of 630 ft. upon a slope, down which it rushes in a series of cascades still farther for a perpendicular distance of 300 ft. From the bottom it has the appearance of a direct fall of 900 ft. The Virgin Tears Fall, on the left side of the valley, just opposite, has a sheer descent of

1,000 ft. The Yosemite Fall, one of the most wonderful features of the scenery in this valley, has a first vertical leap of 1,500 ft., with a series of cascades; the Nevada Fall has a height of 600 ft. While in most of the other falls there is plenty of water throughout the year, the Yosemite and Bridal Veil dwindle into insignificance in Aug. and Sep., because of the drying up of the streams: they are seen at their best in May and June, and in July. Of the massive granite elevations with which the valley is hemmed in, that of the Cathedral Rock, a little above the falls, is 2,660 ft. high; Sentinel Rock, 3,043, its termination being a slender obelisk 1,000 ft. high, and Sentinel Dome, 4,150; El Capitan presents a squarely cut, lofty, and imposing face of rock, rising 3,300 ft.; the Three Brothers, 3,830; North Dome, 3,568; and Half Dome, 4,737. Between the latter two lies a lake with wonderful reflections, called Mirror Lake. Near Cathedral Rock single granite columns 500 ft. high stand out from the mighty walls of the valley, and are known as the 'Spires;' and other strange formations are numerous in the rocky walls, besides many smaller cascades. Where the main valley ends, it branches into three distinct but narrower cañons. The Little Y. V., about 4 m. long and from a half to one mile wide, is a continuation of the larger valley. The celebrated Mariposa Grove of big trees is about 16 m. s. of this valley (see SEQUOIA). There are several hotels in the Y. V. for accommodation of visitors; and encampments of Digger Indians are still seen there. Including the journey to and from the valley, about a fortnight is required to see it thoroughly, from San Francisco. The Y. V. was discovered 1851 by a party under Capt. Boling in pursuit of some predatory Indians; it began to be visited by tourists 1855; and by act of congress 1864 it was committed to the state of Cal., to be held inalienable for all time, for the use, resort, and recreation of the public. See Appleton's *Handbook to the United States*, and Whitney's *Yosemite Guide Book*.

YOTE, or YOAT, v. *yôt* [AS. *geótan*, to pour]: in *prov. Eng.* and *OE.*, to pour, as melted lead into joints; to pour, as water. YO'TING, imp. YO'TED, pp.

YOU, pron. *yó* [AS. *eow*]: the nominative and objective plu. of *thou*: *you* is now commonly used in ordinary language for *thou* and *thee*, and is thus sing. or plu.

YOUATT, *yó at*, WILLIAM: English veterinary surgeon: 1777–1847, Jan. 9. He was a prof. in the Royal Veterinary College, London, and 1828 established *The Veterinarian*, the first periodical of its kind. He published *On Canine Madness* (1830); *The Horse* (1831); *Sheep: Their Breeds, Management, and Diseases* (1832); *Cattle, etc.* (1834); *Obligation and Extent of Humanity to Brutes* (1839); *The Dog: Its History and Diseases* (1842); *The Pig, etc.* (1860); and *The Complete Grazer* (11th ed. 1864). His works have been standard authorities, and several have passed through numerous editions.



## YOUGHAL—YOUMANS.

YOUGHAL, *yaw'hawl* or *yawl*: a seaport and municipal borough of Innakilly barony, county Cork, Munster, Ireland; lat.  $51^{\circ} 57'$  n., long.  $7^{\circ} 52'$  w.; on the estuary of the Blackwater, 157 m. s.w. of Dublin. The town has some structures of interest—the parish church, formed of the nave and aisles of the ancient collegiate church, built by the Earl of Desmond 1464; the 'clock-gate;' and Sir Walter Raleigh's house, which remains nearly in its original state. There is a handsome Rom. Cath. church, also churches of several other denominations; two convents; and several benevolent institutions. The trade of Y. is chiefly in export of agricultural produce. The harbor, obstructed by a bar, does not admit vessels of more than 400 or 500 tons burden; the fisheries are extensive and valuable, and employ a considerable number of hands. There are several remains of buildings, civil, ecclesiastical, and military; and, according to the local tradition, the potato was planted first at Y. by Sir Walter Raleigh.—Pop. (1861) 6,328; (1871) 6,081; (1881) 5,826, largely Rom. Catholics.

YOUMANS, *yó'manz*, EDWARD LIVINGSTON, M.D.: popular scientist: 1821, June 3—1887, Jan. 18; b. Coeymans, N. Y. From his early youth he suffered from ophthalmia, but with the aid of his sister he made large acquisitions in knowledge. In 1851 he prepared a colored chart illustrating the laws of chemical combination; this was used extensively in schools. The next year he began, and for many years continued, to give lyceum lectures. Meanwhile he studied medicine and took the degree M.D. Becoming interested in the evolution doctrines, he did much to promote the circulation in this country of Spencer's philosophy, on which his writings were issued at first in serial numbers by the Messrs. Appleton. He also instituted the *International Scientific Series* of small books 1871; and 1872 the *Popular Science Monthly*, which he edited until his death. His writings and compilations included *Alcohol and the Constitution of Man* (1853). *Handbook of Household Science* (1857); *The Correlation and Conservation of Forces* (1864); and *The Culture demanded by Modern Life* (1868). He died in New York—His brother, WILLIAM JAY Y., M.D., b. Saratoga, N. Y., 1838, Oct. 14, studied in the Sheffield Scientific School, Yale; graduated in medicine from the Univ. of New York; pursued natural history abroad under Prof. Huxley; practiced medicine in Minn.; and, from an assistant in editing the *Popular Science Monthly*, became its chief editor on the death of his brother. He wrote on science for Appleton's *Annual Cyclopædia*; and he was editor of the *Popular Science Monthly* and of Huxley's *Physiology*, adding to it chapters on hygiene. He died 1901, April 10. Their sister, ELIZA ANN Y., b. Saratoga 1826, Dec. 17 assisted her brother Edward; published books on botany for children and youth; also a translation of Quatrefage's *Natural History of Man* (1875); *Descriptive Botany* (1885); and *Bentley's Physiological Botany*, abridged (1886).

YOUNG, a. *yǔng* [Goth. *yunda*, youth; AS. *geong*; Dut. *jong*; Icel. *ungr*; Dan. and Sw. *ung*; Ger. *jung*, young; Skr. *yuvan*; L. *juvenis*; W. *ieuan*, young]: in the early part of life, growth, or existence; not long born; not far advanced or developed; having little experience; ignorant; juvenile; fresh; youthful: N. the offspring of animals. YOUN'GER, a. comp. *-gér*, young in a greater degree: N. in *OE.*, a youngling. YOUN'GEST, a. superl. *-gést*, young in the greatest degree; last born; most recent. YOUN'GISH, a. *-gǐsh*, somewhat young. YOUN'GLING, n. *-glǐng*, an animal in the first stage of life. YOUNG'LY, ad. *-lǐ*, in youth, as, a *young* and inexperienced person; early in life: ADJ. in *OE.*, youthful. YOUNKER, a. *yǔng'kér*, a youngster. YOUNG'STER, n. *-stér*, a young person. YOUNGTH, n. *yǔngth*, in *OE.*, youth.

YOUNG, *yǔng*, ALEXANDER, D.D.: clergyman: 1800, Sep. 22—1854, Mar. 16; b. Boston. He graduated at Harvard 1820; studied divinity; taught in the Boston Latin School one year; and was pastor of the New South Unit. Church, Boston, 1825-54. He was on the Harvard board of overseers 1837-53, and corr. sec. of the Mass. Historical Soc. 1849-54. He published several notable funeral discourses; also *Chronicles of the Pilgrim Fathers of the Colony of Plymouth from 1602 to 1625* (1841), and *Chronicles of the First Planters of the Colony of Massachusetts Bay from 1623 to 1636*; and edited *Library of Old English Prose Writers* (1831-34).

YOUNG, *yǔng*, ARTHUR: English writer on agriculture: 1741, Sep. 7—1820, Feb.; son of the rector of Beddingfield, Suffolk. In 1758, he was apprenticed to a mercantile house in Lynn; but he had no liking for business, and gave much attention to literature. On his father's death, 1759, he undertook the management of a small farm, of which his mother had a lease; and 8 years afterward he became a farmer on his own account in Essex. He seems at the same time to have acted as a parliamentary reporter; and as he saw his farm only from Saturday till Monday, it is not strange that he found it unprofitable. At the end of 5 years he gave £100 to a practical farmer to take the lease off his hands. Meantime he had made notes of the results of numerous experiments on his farm, which he afterward published, under the title *A Course of Experimental Agriculture*. His first successful book was *A Tour through the Southern Counties of England*; which was followed by other works, describing agriculture in various parts of England and in Ireland. The enthusiasm of Y., and his lively style, made his writings popular, and by them the knowledge of many judicious practices, confined to one locality, was spread throughout the kingdom. In 1784 Y. began the publication of the *Annals of Agriculture*, of which 45 vols., 8vo, were published. Three years later he was invited by Count de la Rochefoucauld to make a tour in s. France. What he saw induced him to undertake a series of tours in France, through a great part of which he travelled leisurely on horseback. The result was his most important work, *The Agricultural Sur-*



## YOUNG.

*vey of France.* The author did not confine his attention to agriculture, but described the social and political condition of the people in a lively and truthful manner, and his work has become, in consequence, the most trustworthy source of information regarding the state of France just before the Revolution. Similarly his *Tour in Ireland* shows him to have been an observant and thoughtful political economist. In 1801 the French Directory ordered the whole of his agricultural works to be translated into French: they were published at Paris, 20 vols. 8vo, under the title *Le Cultivateur Anglais*. In 1808 Y. received a gold medal from the English board of agriculture, 'for long and faithful services in agriculture.' Y.'s writings are deemed to have laid the foundation of a practical agricultural literature.

YOUNG, BRIGHAM: Mormon president: 1801, June 1—1877, Aug. 29; b. Whittingham, Vt.; son of a small farmer proprietor. He learned the trade of a painter and glazier. He belonged to the Bapt. Church; but in 1832, having become converted to Mormonism, he was made an elder of the Church of the Latter-day Saints, and began to preach at the Mormon settlement at Kirtland, O. In 1835 he was appointed one of the 12 apostles of the church, and was sent as a missionary to the New England states, where he was successful in making converts. After the Mormons had been driven from Kirtland to Mo. and from Mo. to Ill., and after Joseph Smith (q.v.) had been murdered by a mob (1844), Y. was chosen pres. in his place. The year following, the charter of Nauvoo was repealed by the legislature of Ill.; and after a cannonade of three days the Mormons were driven from their capital and temple, and were led by Pres. Y. to Utah, where they arrived, after a toilsome journey, 1847, July 24. Next year the great body of Mormons arrived and founded Salt Lake City; and 1850 Pres. Fillmore appointed Y. gov. of the territory for four years. In 1854, in consequence of the Mormons setting the federal laws at defiance, by having in 1852 proclaimed polygamy as the 'celestial law of marriage,' Col. Steptoe was appointed gov. in Y.'s place; but on visiting Utah he thought it an unsafe residence, and resigned. The Mormon pres. exercised supreme authority, and said: 'I am and will be governor, and no power can hinder it until the Lord Almighty says, "Brigham, you need not be governor any longer."' In 1857 a new gov., Cumming, was appointed, and sent with a force of 2,500 U. S. troops to protect him and the federal officers; but Y. forbade them to enter the territory, and cut off the supply-trains. A compromise was, however, effected; the Mormons were pardoned, and the troops remained until 1860. The determination of the United States to abolish polygamy, and the appointment 1869 of a new U. S. gov., somewhat reduced Y.'s authority. In 1874 his 15th wife petitioned the U. S. courts for a divorce, and separated from him. Y. at his death left an estate of two million dollars to 17 wives and 56 children,—See MORMONS: SALT LAKE CITY; UTAH.

## YOUNG.

YOUNG, CHARLES AUGUSTUS, PH.D., LL.D.: astronomer: b. Hanover, N. H., 1834, Dec. 15. He graduated at Dartmouth 1853; was classical teacher in Phillips Acad., Andover, 1853-56, pursuing theol. study during the last year; and was prof. of math., nat. philos., and astron. in Western Reserve Coll., O., 1856-66, in 1862 serving three months as capt. of a volunteer company of students. In 1866 he was called to the chair of nat. philos. and astron. at Dartmouth, a professorship which had been filled by his father, Ira Y., and by his grandfather, Ebenezer Adams. During the total eclipse of the sun 1869, Aug. 7, he was stationed at Burlington, Io., and made spectroscopical observations separating in the corona the iron line D 1,474 of the solar spectrum from one peculiar to the corona. In 1870 he observed the eclipse from a station in Spain, and found that in the lower strata of the sun's atmosphere the spectrum lines, dark as ordinarily observed, indicating elements in a gaseous condition, are converted into bright lines, showing that to a considerable extent the elements or their compounds exist probably as minute incandescent droplets near the body of the Sun (q.v.); this lower portion of the solar atmosphere is called the 'reversing layer.' In 1872 he made further observations at Sherman, Wyo., detecting sulphur, cerium, and strontium in the chromosphere. He went to China 1874, to observe the transit of Venus. Since 1877 he has been prof. of astron. at Princeton. By an original application of the principle that the approach or recession of stars affects the wave-lengths of light as received by the spectroscope, he measured the sun's rate of rotation, and especially the relative velocity of the surface as compared with the deeper strata. An automatic spectroscope invented by him came into general use. He also devised a method of increasing dispersion by passing the ray again through prisms by reflection. He has lectured with great acceptance before leading institutions; has been elected to memberships and offices in learned associations, Amer. and foreign; contributed much to scientific and other journals; and has published *The Sun* (1882); *A Text-book of General Astronomy* (1888); and *The Elements of Astronomy, with a Uranography* (1890). In 1891 he received the Janssen prize from the French Acad. of Sciences, awarded for the most important researches in physical astronomy. In reference to his observations on the sun's rotation, Prof. Richard A. Proctor said he had 'effected the most delicate piece of spectroscopic observation yet achieved by man.'

YOUNG, EDWARD, D.C.L.: author of the well-known *Night Thoughts*: 1681-1765, Apr. 12; b. Upham, near Winchester, England; son of the rector of that parish, who was also dean of Sarum. He was educated at Winchester School, and 1703 went to Oxford. In 1708 a law fellowship in All Souls' College was conferred on him by Abp. Tenison. He seems to have done nothing in the law, occupying himself, by preference, with poetry and religious studies. In 1714 he obtained his degree B.C.L., and 1719 D.C.L. Meantime he had come before the world as a



poet, publishing 1713 an *Epistle to George, Lord Lansdowne*, on his being created a peer. This was a characteristic beginning for Y., who was one of the most persevering and invincible toadies that ever flattered a patron. In the same year he published two other poems—*The Last Day*; and *The Force of Religion, or Vanquished Love*; the year following he again flowed forth in *A Poem on the Death of Queen Anne*. These performances procured him immediate reputation. In 1719 he ventured on the more ambitious effort of a tragedy, which, under the title *Busiris*, was brought out at Drury Lane. The piece had a fair success; and probably through it he attracted the notice of the eccentric Duke of Wharton, with whom, in the end of that year, he was induced to go for a short time abroad. The duke seems to have entertained for him a real kindness, and to have treated him with much liberality. At the duke's death Y. set forth certain claims against his estates, which he succeeded in making good to the extent of an annuity of £200. The details of the case involve nothing dishonorable to Y., yet convey a somewhat unpleasing impression. In 1721 was produced his tragedy *The Revenge*, which, unsuccessful at the time, has since had greater acceptance, and is the only one of his pieces still occasionally acted. His third and last attempt in this field, *The Brothers*, was produced 1753. In succession 1725–28 appeared his satires, under the title *The Love of Fame, the Universal Passion*. These had great success, and brought to their author money as well as fame: they abound with wit and vivacious observation, and even now will well repay perusal. Of *The Instalment*, a poem, issued 1726, and addressed to Sir Robert Walpole on his being made a knight of the Garter, it seems enough to say that, inasmuch as we incidentally hear from Swift of a pension granted Y., we may surmise that this was the service to the public by which he had contrived to earn it. In 1727 Y., having taken holy orders for the purpose, was appointed one of the royal chaplains; and in 1730 he became rector of Welwyn, in Hertfordshire. The next year he married Lady Elizabeth Lee, daughter of the Earl of Lichfield, and widow of Colonel Lee. He is supposed to have been very happy with her, as he showed great grief on her death 1741. It is believed that from his solemn meditations on the event he got the suggestion of the *Night Thoughts*, begun shortly after, and published 1742–46. By this work almost solely it is that he is remembered. His mind retained its activity to the last. He published other works, now entirely forgotten; and 1762 superintended a collected ed. of his works, 4 vols. 12mo, from which he had the grace to exclude certain of the most fulsome of his dedications, probably as having served their turn, and not likely to be of further use. Since his death his *Night Thoughts* has passed through editions innumerable: it displays much gloomy force of pious reflection; and has passages of fine imagination, frequently somewhat marred by an epigrammatic mannerism of expression. Certain of its sententious lines have passed into common use and become in a man-

her proverbial. Though now somewhat declined from the estimation in which he was long held, Y. will doubtless continue to hold a distinct and even high place in that interval in our literature which divides the artificial and so-called classical school of Pope from the return to a simpler and more natural manner, heralded some time afterward by Cowper. If we except Y.'s one great weakness of character—an inordinate appetite for preferment and worldly honors, which sought its gratification in ways somewhat servile and unworthy—there seems every reason to believe that Y. was, on the whole, an excellent and worthy man.

YOUNG, JAMES: British chemist: 1811, July—1883, May 13; b. Glasgow. He began the study of chemistry under the eminent Prof. Thomas Graham in Anderson Coll.; became his assistant; was with him in University Coll., London, 1832–38; and was afterward in the chemical works at St. Helen's and at Manchester. About 1847 he began experiments on mineral oil from a Derbyshire coal mine, and produced from it lubricating and burning oils. He next invented a method of slow distillation of oil from bituminous shale, thus founding a great oil industry in Scotland, which brought him ample returns. His experiments on mineral oil led to development of its value in this country. He also discovered the use of lime in preventing the corrosion of ships by bilge-water. A chair of technical chemistry was founded by him in Anderson Coll.; and he fitted out an expedition to Africa, which ascertained the death and discovered the body of Dr. Livingstone 1872.



## YOUNG.

YOUNG, JOHN, LL.D.: Scotch divine: b. about 1810. After studying theology, he was pastor of Albion Chapel, Moorfields, and later of a church in Edinburgh. He is author of *Lectures on the Controversy between Protestants and Roman Catholics* (1836); *The Christ of History* (1855), republished 1868 with an appendix on Renan's Life of Christ, and regarded as a very able work; *Evil and Good, the Mystery* (1856); *The Province of Reason* (1860), a criticism of Mansel's Bampton lectures on the *Limits of Religious Thought*; *The Life and Light of Men* (1866); and *The Creator and the Creation, how Related* (1870).

YOUNG, JOHN RUSSELL: editor: b. Downingtown, Penn., 1841, Nov. 20. Educated in the schools of Philadelphia and New Orleans, he was at the age of 16 in the employment of the *Press* newspaper at Philadelphia, and during nearly the entire civil war was correspondent in the field, first with the Army of the Potomac, and afterward on the Red river expedition, returning to the editorship of the *Press*. In 1865 he accepted an engagement with Jay Cooke & Co. to write up a national loan to the Northern Pacific railroad. His articles attracting the attention of Mr. Greeley, Y. became managing editor of the *New York Tribune*, 1866-69. Meanwhile he was studying law, to the practice of which he was admitted 1867. In 1869 he founded the *Standard* newspaper. He was European correspondent of the *New York Herald* 1871-77; journeyed with Pres. Grant; and was U. S. minister to China 1882-85. Since then he resumed editorial work. He published *Around the World with General Grant* (2 vols. 1879). He was appointed 1892, Apr., fourth vice-pres. of the Philadelphia and Reading railroad, with supervision of its newspaper interests.

YOUNG, JONATHAN: naval officer: 1825, Nov. 27—1885, May 17; b. in Ohio. Beginning as midshipman 1841 he was present in a conflict with privates off the coast of Cuba, and at the capture of a slave-ship. In 1845-48 he was on the ship of war *Columbus* in a voyage around the world, and was successful in delivering a letter to the then exclusive Japanese authorities. In 1855 he was promoted master and lieut., while cruising on the *Massachusetts* in the Pacific, and had part in fighting the Puget Sound Indians. After serving in the Paraguay expedition, and in the Mediterranean, he was present at the capture of the Hatteras and Port Royal works 1861; pursued the privateer *Sumter* to S. America and the Mediterranean; commanded the *Pembina* in the Gulf; was in charge of the Naval Observatory, Washington, and of the Portsmouth navy-yard, 1869-72; served in the Brazil and the Asiatic squadrons; and, having risen through various grades, was made commodore 1882. He died while commanding the station at New London, Conn.

YOUNG, THOMAS, M.D.: one of the most ingenious and original philosophers and one of the most learned linguists of the 19th c.: 1773, June 13—1829, May 10; b. Milverton, Somersetshire, England. His parents, Thomas and Sarah Young, were strict Quakers; and Y. had the impression that the peculiar doctrines of the Quakers had a favorable influence on his character and career. In particular, he connected with the Quaker doctrine of divine suggestion the perseverance with which he followed up any pursuit in which he engaged, to which he, like Buffon, was disposed to attribute all the discoveries which his genius enabled him to make. Wonderful stories of his youthful precocity have been recorded, and they seem to have more truth than such stories usually have. In 1780 he was sent to a boarding-school at Stapleton, near Bristol, where he remained two years; he was afterward put to a school at Compton, in Dorsetshire. When he left Compton, in his 14th year, besides having a great knowledge, for his age, of Greek and Latin and of mathematics, he had learned French and Italian, and, without any tuition, had made considerable progress in Hebrew, Persian, and Arabic. In 1787 he went to live with David Barclay of Youngsbury, near Ware, in Hertfordshire, an eminent member of the Soc. of Friends, partly as the fellow-pupil, partly as the tutor, of that gentleman's grandson, Hudson Gurney. A Mr. Hodgkin was called in to assist the studies of the two lads, but Y. soon proved to be superior in acquirements to his instructor, and virtually the three became fellow-students. Mr. Hodgkin published 1793 a work entitled *Calligraphia Græca*, which he dedicated to Young. Y. continued with Mr. Barclay till 1792, spending the summer months in Hertfordshire, and the winter in London, studying Greek and Latin, the modern languages—the oriental and the European—the higher mathematics, and natural philosophy, and, by way of amusement, botany and zoology. He taught himself to write Latin with fluency and elegance, and to write Greek verses, which received the commendation of some of the best judges of the time. During the winters of 1790, 1 he attended lectures on chemistry in London; but neither then nor at any subsequent time did he show much disposition toward experimenting: his bias seems to have been toward the pure rather than the observational sciences.

Toward the end of 1792 he began to study medicine; and he attended medical lectures for two years in the schools of London, and afterward for a year at the Univ. of Edinburgh. After going to Edinburgh, Y. gave up the Quaker dress and the more inconvenient Quaker customs; he took lessons in music and dancing, mixed freely in society, and went occasionally to the theatre. These changes, though not intended to go further, eventually led to his complete estrangement from the Society of Friends. From Edinburgh he went to the German Univ. of Göttingen, from which, after nine months' residence, he got the degree M.D. He continued more than a year longer in Germany, and visited various medical schools, returning to England 1797, Feb. At that time the membership of



## YOUNG.

the College of Physicians was restricted to graduates of Oxford and Cambridge; and to qualify himself for it, Y., on his return, entered as a fellow-commoner at Emmanuel College, Cambridge, at which he remained until he took his degree 1799. In 1800, having become a member of the College of Physicians, he took up his residence in London, and began to practice as a physician. He took the degree M.B. at Cambridge 1803, and M.D. 1807. His mother's uncle, Dr. Brocklesby, who died 1797, had left him £10,000, besides his house in London, with his furniture, library, and collection of pictures, so that he was in possession of a moderate competency.

In 1801 he was appointed prof. of nat. philosophy in the Royal Institution, then newly established, and he began to deliver lectures early in the following year. As a lecturer he was not popular, his style being too condensed, and the matter of his lectures unsuited to the miscellaneous audiences of the Royal Institution. He published 1802 a *Syllabus of a Course of Lectures on Natural and Experimental Philosophy*, in which, among other things, he first announced his great discovery of the law of the Interference of Light (see INTERFERENCE), which by itself, as Sir John Herschel has remarked, would have procured him a scientific immortality. It was this discovery which first fairly turned the balance of evidence in favor of the undulatory as against the molecular theory of light (see UNDULATORY THEORY OF LIGHT). It is Y.'s most important contribution to science. He had been elected a fellow of the Royal Soc. as soon as he was 21; in 1802 he became its foreign sec., a post which he retained till the end of his life. He resigned his professorship on his marriage 1804, fearing that his filling a chair of science might interfere with his success as a physician. The lectures which he delivered as prof. were the foundation of the *Course of Lectures on Natural and Mechanical Philosophy* which he published 1807—a great work, embodying a complete system of natural and mechanical philosophy, on which he was engaged nearly five years. A new ed. of these lectures was published 1845, edited by Prof. Kelland of Edinburgh. Y.'s doctrine of Interference was at first unfavorably received by scientific men in England: it was attacked and ridiculed in the *Edinburgh Review*; and so little interest was taken in the subject, that of a pamphlet which Y. published in answer to the *Edinburgh Review* only a single copy was sold. As has often happened, the first recognition of the importance and ingenuity of this and others of Y.'s speculations came from the scientific men of the continent.

Y. was admitted a fellow of the College of Physicians 1808, and was elected one of the physicians of St. George's Hospital 1810. He afterward published several medical works, which, though they were little more than compilations, and are now forgotten, show that he was thoroughly versed in the history of diseases and of medical opinion. His hospital practice, too, is said to have been successful; but he had little success in getting patients. He retired

## YOUNG MEN'S CHRISTIAN ASSOCIATIONS.

from practice—retaining, however, his connection with St. George's Hospital—1818, on his appointment to be sec. of the Board of Longitude. On the dissolution of the Board of Longitude, he became sole conductor of the *Nautical Almanac*; and afterward, when the system of life insurance began to be popular, he held, with this post, the office of scientific adviser of a life insurance company. During the last years of his life he was a member of a council appointed to advise the admiralty in scientific matters.

Y.'s greatest achievement, after his great discovery of the law of Interference, was in connection with the subject of Hieroglyphics (q.v.). He was the first to hit on the process of investigation by means of which the received interpretation of hieroglyphics has been arrived at. His discovery was published originally in papers written for the Soc. of Literature, afterward in the *Encyclopædia Britannica*, and in a book 1823. In his later years much of his attention was given to this and cognate subjects. He was engaged on an Egyptian dictionary at the time of his death. His miscellaneous writings, contributions to Transactions of learned and scientific bodies, to reviews, and to the *Encyclopædia Britannica*, were very numerous. Three volumes of them, two consisting of Scientific Papers, ed. by Dean Peacock, the third of Hieroglyphical Essays and Correspondence, ed. by John Leitch, were published 1855.

He died after several months of failing health. His character seems to have been singularly amiable, and to have endeared him to a multitude of friends, by one of whom, Dr. Peacock, dean of Ely, an ample biography of him was published 1855. Y. was two years before his death, elected a foreign associate of the Acad. of Sciences at Paris, succeeding to the illustrious Volta.

**YOUNG ENGLAND:** in *Eng. hist.*, a small party of young aristocrats, of fashionable tastes, who, during the early manhood of Disraeli, afterward Lord Beaconsfield, sought to model England according to their conservative views. It soon passed away, and the name fell into disuse.

**YOUNG MEN'S CHRISTIAN ASSOCIATIONS:** organizations for religious and other benefits, and for Christian work. The movement for their formation dates from 1844 in London, and somewhat later in this country. But there were earlier associations with similar aims. In 1632 there was one of apprentices in London, for spiritual exercises, meeting before church-time on the Lord's Day. About 1668 some young men in the English Church were organized, under clerical guidance, for religious improvement and charitable work; and from this grew other societies, besides many in the reign of Charles II. and James II., not confined apparently to young men, and most prosperous in the reign of William and Mary. (See *Hist. of Religious Societies in the City of London*, by Josiah Woodward, D.D., 1700.) In 1710 the Rev. Cotton Mather, of Boston, in his *Essays to do Good*, addressed certain societies under the title 'Young Men Associated,' and says,



## YOUNG MEN'S CHRISTIAN ASSOCIATIONS.

'These, duly managed, have been incomparable nurseries for the churches.' John Wesley and his friends, while students in the university, formed a religious association. From the societies mentioned by Dr. Woodward sprang many also 'for the Reformation of Manners,' i.e., the suppression of vice. In 1838 David Nasmith, founder of the London City Mission, wrote: 'Since the close of the year 1823, the privilege has been granted me of forming about 70 Young Men's Societies in the United Kingdom, France, and America;' the members were of those 'professing no opinions subversive of evangelical principles,' and the object was 'mutual improvement and benevolent exertion;' the name was afterward changed to Christian Young Men's Union. In Cincinnati, 1848, Oct. 14, was formed a young men's organization which soon took the name Society for Religious Inquiry.

The direct origin of the present widely extended associations is traced to George Williams, of London, who, when a clerk, 16 years of age, united as many as he could of his 80 fellow-clerks for prayer and Bible study, in 1844; and with others decided to organize a Young Men's Christian Assoc., June 6. In America the first assoc. on the London basis was at Montreal, 1851, Nov. 25; and the first in the United States was organized in Boston, 1851, Dec. 29. In two years 26 had been formed; and in 1854 the first general convention was held, and the N. American confederation of the associations was formed, which continued until 1863, since which the annual convention and its central committee, named in 1879 the international, with permanent offices in New York after 1866, have been the bond of union. A special convention 1861 formed the United States Christian Commission for beneficent work in the war. The *Young Men's Magazine*, as organ, was published 1857-59. The convention of 1866 recommended the second Lord's Day in Nov. every year as a day of prayer for the associations, the institution of state and provincial conventions, and the publication of a quarterly journal (changed to the *Association Monthly* 1869). The Railroad Branch of the work originated Cleveland, O., 1872-3, but the first separate organization is tabulated 'New York G. C. Station, 1875.' Its magnificent building, near the Grand Central station, was the gift of Cornelius Vanderbilt. The college organizations began independently in the universities of Michigan and Virginia 1857-8; the German in Allegheny, Penn., 1871, though this work was begun in St. Louis 1870; that of colored people in Central Tennessee College 1875; the Indian associations are not dated. The whole number of Amer. associations for 1902 is 1,575, reporting an aggregate membership of 323,224. They occupy 414 buildings of their own, and have 736 libraries, and nearly 30,000 young men attended the educational classes. The property owned by the associations was valued at \$24,101,229. The reports include libraries, reading-rooms, gymnasia, educational classes, lit. societies, lectures, entertainments,

## YOUNG WOMEN'S CHRISTIAN ASSOCIATIONS.

sociables, Bible classes, and religious meetings. The tendency has been of late years to restrict the work to the benefit of young men, in place of outside work, and to define more strictly the evangelical basis. Similar associations exist in nearly every part of the world, e.g., Hawaii, Japan, Australasia, India, Turkey, Italy, France, Switzerland, Germany, Denmark, Sweden, Norway, Great Britain, Mexico, nearly all our states, and the provinces of British America. The first World's Conference of associations was held in Paris, 1855.

**YOUNGS'TOWN:** city, cap. of Mahoning co., O.; on the Mahoning river; and on the Erie, the Lake Shore and Michigan Southern, the Pennsylvania, the Pittsburg and Western, and the Pittsburgh and Lake Erie railroads; 65 m. s.e. of Cleveland, 68 m. n.w. of Pittsburgh. It is an agricultural region, and is also the centre of the O. block coal basin. In 1902 the city had natural and manufactured gas and electric lighting plants; efficient water, sewerage, fire, police, telegraph, and telephone services; electric street railway; 56 churches (Meth. Episc. 10; Rom. Cath. 8; Luth. 7; Bapt. 6; Prot. Episc. 2; Presb. 7; Congl. 2; Hebrew 2, Swedish 2, and Disciples, Evang. Assoc., Meth. Prot., and Ref., each 1); 23 public schools (value of buildings \$800,000); 5 national banks (cap. \$1,429,000) and 1 private bank; and 2 daily, 5 weekly and 1 monthly periodicals. Y. is noted for its coal and iron interests and for various industries connected therewith. The coal production of Mahoning co. 1888 was 331,035 tons, nearly one-third the total product of the state. In 1890 there were 16 blast furnaces and 16 rolling mills in operation. The manufactures, employing more than \$6,000,000 capital and 7,000 hands, and yielding annual products of about \$10,000,000, include mercantile iron, steam-engines and boilers, foundry and machine-shop products, pig-iron, wrought-iron pipes, iron fencing, flour, sashes, blinds, doors, scales, ale, beer, bolts, nuts, stoves, carriages, and tinware. Pop. (1880) 15,435; (1890) 33,220; (1900) 44,885.

**YOUNG WOMEN'S CHRISTIAN ASSOCIATIONS:** organizations corresponding to those for young men, and distinct from the earlier formed Women's Christian Associations. The plan has in view especially the spiritual and other benefit of young women themselves, and originated in several independently organized associations in schools—the first in the Normal University, Normal, Ill., 1872. About 11 years later 80 or 90 associations had come into existence, stimulated by the formation of those for young men in educational institutions. An attempt failed to affiliate with the 'Women's,' and a national committee was elected 1886, also visiting secretaries. Associations multiplied; in 1891, Apr., when the International Convention met at Scranton, Penn., there were organizations in 13 states holding annual conventions, 42 city associations, and 200 in colleges. The basis is Protestant and evangelical. The New York city assoc. has a noble building in East 15th st., the receipts and expenditures each amounting



## YOUR—YPRES.

in 1891 to more than \$31,000, and the advantages including lectures, library, and reading-room; religious, commercial, art, needle-work, and other instruction; an employment bureau, board directory, and an Asbury Park summer home. Connected with the edifice, and facing 16th st., is the no less elegant Margaret Louisa Home for temporary board, built by Mrs. Elliott F. Shepard, 1890, with receipts and expenditures each more than \$48,000 in 1891, and in that year furnishing 25,459 lodgings and 171,111 meals. — The WOMEN'S CHRISTIAN ASSOCIATIONS, as reported at the International Conference, 1889, Oct., had 58 local organizations, of which 12 were named Young Women's, and some in colleges; the religious basis and the advantages offered are apparently the same as in the Young Women's Associations above described, with the addition of 'outside' work, such as here and there a hospital, a dispensary, an arrangement for nursing the sick poor, a home for aged or friendless women, a children's home or one for incurables, a branch savings bank, etc. One of the associations in this affiliation was the pioneer, 1860, and bears the name of the Ladies' Christian Union; it is in New York, where also was formed 1873 a Young Woman's Christian Assoc. now belonging to this International conference, and having its quarters at 44 West 38th st. At the international conference of the Young Women's Christian Association in 1895 there were reported 61 city associations, 280 college associations, and a total membership of over 24,000.

**YOUR**, pron. plu. *yôr*, or **YOURS**, *yôrz* [AS. *eower*, of you, your—originally gen. of *ge*, ye]: the possessive plu. of *thou*; belonging to you. **YOUR** is used when prefixed to a noun or adjective, as, 'this is *your* book;' and **YOURS** when the noun goes before, or is understood, as, 'this book is *yours*.' **YOURSELF**, pron. *-sêlf*, plu. **YOURSELVES**, *-sêlvz* [*your*, and *self*]: an emphatic or reflexive form of *you*; as, behave *yourselves*; this is intended for *yourself*; you *yourselves* know.

**YOURT**, n. *yôrt*: a Mongol tent or encampment.

**YOUTH**, n. *yôth* [from **YOUNG**, which see]: the part or period of life which extends from puberty to full growth, but in a wider sense the whole early part of life; a young person; especially, a young man; collectively, young persons; the condition of being young; youngness; freshness, as, she retains her *youth*. **YOUTHS**, n. plu. *yôthz*, young persons; young men. **YOUTHFUL**, a. *yôth'fûl*, pertaining to the early part of life; young; suitable to the first part of life; fresh; vigorous, as in youth. **YOUTHFULLY**, ad. *-lî*. **YOUTH'FULNESS**, n. *-nêš*, the quality of being youthful.

**YPRES**, *ê'pr*, or **YPEREN**, *î'pêrn*: town of Belgium, formerly fortified, province of West Flanders; in a fertile plain on both sides of the Yperlee, about 29 m. s.s.w. of Bruges (53 by railway). The marshes around the town formerly rendered it very unhealthful, but considerable improvement has been effected by drainage. **Y.** was one of the most important manufacturing towns in Flanders, being said to have had in the 14th c. a pop. of 200,000,

## YPRES-LACE—YPSILANTI.

and 4,000 looms. Its staple manufacture consisted of the cloth called, according to some, after the name of the town, Diaper; though this derivation must now be given up. The only remnant of its flourishing manufacture is the Cloth-hall (*Les Halles*), in the great market-place, a building of prodigious size, in the form of a trapezium, in a rich style of Gothic architecture, and surmounted by a stately square tower or belfry, with a clock and chimes. It was begun 1230, and continued till 1342; the e. end, supported on pillars, being added 1730. One of the wings is now used as the *hôtel-de-ville*, and other parts are occupied by different public establishments, and concert-rooms. The Cathedral of St. Martin is a fine Gothic edifice, with an altar of Carrara marble, a richly carved pulpit, and a picture doubtfully attributed to Van Eyck. Other buildings are the churches of St. Peter, St. James, and St. Nicolas, the old castle-ward, two colleges, several hospitals, barracks, numerous boarding and day schools, etc. The chief modern manufactures are thread, lace, linens, woollens, cottons, silk, ribbons, leather, oil, soap, tobacco. There are many tanneries, oil-mills, salt-works, dye-works, breweries. The town is connected with the Yser by canal, and is a station on the W. Flanders railway.—Pop. (1890) 16,505.

Y. is ancient, its origin dating from the 9th and 10th c. In 1688 it was strongly fortified by Louis XIV., and in the great European wars was frequently subject to sieges.

YPRES-LACE, n. *ē'pr-lās*: the finest and most expensive kind of Valenciennes lace, made at Ypres in Belgium.

YPSILANTI, *īp-sī-lăn'tī*: city in Washtenaw co., Mich.; on the Huron river; and on the Michigan Central and the Lake Shore and Michigan Southern railroads; 8 m. e.s.e. of Ann Arbor, 30 m. w.-by-s. of Detroit. The city is built on both sides of the river, which affords excellent water-power and is here spanned by two iron bridges; and is in a fertile agricultural region. Y. is the seat of the State Normal School, opened 1853, which had (1888-9) 27 instructors, 803 pupils in all departments, 1,641 graduates since opening, \$52,485 in total revenue, and \$61,235 in invested funds. The city has a high school, several grammar schools, business college, several public halls, 1 national bank (cap. \$25,000), 1 state bank, 3 weekly and 2 monthly periodicals, and planing, paper, and woolen mills. Pop. (1880) 4,984; (1900) 7,378.

YPSILANTI, *īp-sē-lăn'tē*: Fanariot family, for which is fallaciously claimed a descent from the imperial stock of the Comneni; and which has furnished various champions of the Christian population under Turkish rule.—The first of these, Prince CONSTANTINE Y. (1760-1816, b. Constantinople), for his translation of the works of Vauban, was raised to high official rank by Sultan Selim III., and was subsequently appointed hospodar of Moldavia 1799, and of Walachia 1802. His administration in these provinces was marked by wisdom and energy; but his ill-concealed sympathies with Russia led (1806) to his dismissal



and flight to Transylvania. Re-established in the govt. of Walachia by the Russians, he showed his hatred for the Porte by inciting (1807) the Servians to insurrection; but soon finding that his allies, the Russians, had views and aims quite inconsistent with his, and unable to strive with both Russians and Turks, he took the oath of allegiance to the czar, and retired to Kiev, where he died. He left numerous works, in Italian, French, and Turkish.

His three sons, Alexander Y., Demetrius Y., and Nicolas Y., followed the same policy.—The eldest, ALEXANDER (1783–1828), served in the Russian army, and was chosen by the ‘Hetairists’ as their chief 1820. In promotion of the cause of Rouman independence, he collected a large sum by subscription in Russia, and afterward, invading Moldavia, raised an insurrection in both principalities. But, little suited by natural gifts to guide the movement that he had originated, he was attacked by the Turks near Galatz, totally defeated; and forced to take refuge in Austria, where he was arrested and imprisoned. Released after a time, but broken in spirit by chagrin and privations, he retired to Vienna, where he died.—The next younger son, DEMETRIUS (1793–1832), began his career in the Russian army, and joined his brother in his schemes for emancipating from servitude the Christian population of Turkey. Sent to Greece, armed with powers from his brother, he took a glorious part in the capture of Tripolitza (1820, Oct.), but was less successful in the following year in his attack on Eubœa. His gallant defense of Argos against the Turks stopped the victorious march of the latter, and gained (1823) for him the honorary titles Pres. of Argos, Prince of the Peloponnesus, Pres. of the Legislative Council, and Senator. His stubborn resistance (1825) to the victorious Ibrahim at Napoli was another valuable service to Greece. In 1827 the grateful Hellenes made him commander-in-chief of their forces; but some difference arising between him and the pres., Capo d’Istria, he resigned his post 1830, Jan. He died at Napoli di Romania. Y. was insignificant in appearance, but had the soul of a hero; and was as deaf to the allurements of pleasure as to the promptings of ambition.

YPSIPETES, n. *îp-sîp'ě-těz* [Gr. *hupsipetēs*, high-flying; *îupsi*, high; *petomai*, to fly]: in *entom.*, a genus of moths of the family *Larentidæ*.

YSSEL, or IJSSEL, *îs'él*: river of the Netherlands, formed by the junction at Doesburg, in Gueldres, of the Oude (Old) Yssel from Westphalia and the New Yssel, an offset of the Rhine, cut about B.C. 10 by the Roman general Drusus. After this it flows n. and then n.w. past Zutphen and Deventer, forming part of the boundary between Gueldres and Oberyssel, and, passing Kampen, falls into the Zuider Zee, after a course of about 80 m., forming at its mouth a delta, which is gradually increasing. The principal affluents are the Borket, the Schipbeek, and the Grift.—There is another river of the same name, branch of the Rhine, in the province of Utrecht.

## YSTAD—YUCATAN.

**YSTAD**, *is'tád*: seaport-town in the extreme s. of Sweden, on the Baltic, in the laen of Malmöhus, about 30 m. s.e. of Malmö. The town is well built, and has a handsome market-place, two churches, a town-house, barracks, etc. There is a good harbor, and a brisk and improving trade; steamers plying to Stockholm, Lübeck, Kalmar, Stettin, Stralsund, and Copenhagen putting in here. It has manufactures of tobacco and snuff, chicory, soap, woolen cloths, and leather; there is also some ship-building. —Pop. (1890) 8,235.

**YTHAND**: see **EIDENT**.

**YTTERBIUM**, *ýt-tér'bí-üm* (sym. Yb, at.wt. 172·5 [?]): an element discovered in Gadolinite (q.v.), but of which little is known.

**YTTRIA**, n. *ýt'rí-a* [from *Ytterby*, in Sweden, where first found, 1794]: sesquioxide of Yttrium (q.v.); a soft nearly white powder ( $Y_2O_3$ ), which when ignited glows with a pure white light. According to Mosander, three bases have been confounded under the single name Ytria; to the most abundant of these he gives the name Y., while he distinguishes the others as *erbia* and *terbia*. **YTTRO-**, *ýt'rô*, a prefix signifying that the compound contains *yttria* as a constituent. **YT'TRIOUS**, a. -*üs*, pert. to or containing *yttria*.

**YTTRIUM**, *ýt'trí-üm* (sym. Y, at. wt. 89): very rare metal, found in Gadolinite (q.v.), in *yttrotantalite*, and in one or two other very scarce minerals. Neither the metal, the oxide (yttria), nor the salts of the oxide, are of practical importance. **YT'TRIUM-GAR'NET**, a variety of garnet occurring in Norway, containing, according to Bergemann, sometimes as much as 666 per cent. of yttria.

**YTTROCERITE**, n. *ýt-trô-sēr'ít* [prefix *yttro-*; Eng. *cerite*]: mineral occurring, associated with albite and topaz, at various places near Fahlun, Sweden; lately found in a few localities in the United States. Its hardness is 4 to 5; sp. gr., 3·447; lustre, vitreous to pearly; color, violet-blue shading to white; comp., variable, consisting of the fluorides of calcium, cerium, and yttrium.

**YU**, or **YUH**, n. *yü* [Chinese]: a species of nephrite, highly prized by the Chinese, especially the green and white kind called *fei-tsui*, or 'kingfisher-plumes': it is used for vases, bracelets, rings, etc. *Yu* is jadeite, but is usually called jade.

**YUCATAN**, *yü-ká-tán'*: region in the s.e. extremity of Mexico; consisting of two confederated states, Campeachy (Campeche) in the w. and Y. in the e.; forming a peninsula between the Gulf of Mexico and the Caribbean Sea; 280 m. long, 200 m. in average breadth, 700 m. of coast-line; 55,400 sq. m. (Y. 29,570 sq. m., cap. Merida—q.v.; Campeachy 25,830 sq. m., cap. Campeachy—q.v.). The extreme n.e. point extends to within 120 m. of Cuba. The surface is largely a table-land. The climate is hot, with deficient rainfall, but is not unhealthful, except that the region is subject to periodical visits of yellow fever. The soil is cal-



# YUCCA.

careous and porous; and little is seen of the ancient fertility which must have characterized this region when it was the seat of a flourishing civilization, with populous cities of great size and splendor. Only a small portion of the country is under tillage, and the general appearance is that of a wilderness. Vastly different was the scene at the time of the Spanish conquest 1527-47, 'as revealed by the innumerable remains of towns, cities, temples, palaces, and other public buildings dotted over the plateau, especially round the now desolate n. and n.e. shore of the peninsula.' The vast ruins are the mysterious monumental remains of the Maya nation, whom the Spanish found here, and whose descendants constitute five-sixths of the present population. There is no evidence for the great antiquity (1,700-2,000 years) formerly assigned to the ruined structures in Y.; yet they are considered to antedate the southward Toltec migration—some of the cities having been forgotten ruins at the time of the Spanish conquest.—Pop. (1892) Y. and C. combined, 329,621; (1900) Y. 312,264.

**YUCCA**, *yŭk'ka*: genus of plants of nat. order *Liliaceæ*, natives of N. America, and some of which are often cultivated in gardens for the singularity and splendor of their appearance.



*Yucca gloriosa.*

*Y. gloriosa*, the so-called Dwarf Palmetto or Mound Lily, is a native of the s. parts of N. America. It has a stem about 2 or 3 ft. high, whose upper part produces a great tuft or crown of large sword-shaped evergreen leaves, each terminating in a sharp black spine. From the centre of this crown of leaves arises the flower-stalk, 3 ft. or upward in height, branching out on every side and forming a great panicle. The flowers are bell-shaped and drooping, white with a purple stripe on the outside of each segment of the perianth. The fibres of the leaves are used by the Amer. Indians to make a sort of cloth and cordage, and are used by Mexicans for ropes and packing.—The other species have a general resemblance to this in habit and appearance. *Y. brevifolia* of the s. Rocky Mts., the Joshua Tree, grows to 40 ft., and in places like a forest.

*Y. angustifolia* extends n. to the Dakotas. Other southern species are *Y. filamentosa*, a common and showy plant cultivated in northern gardens, and named from the thread-like fibres on the edges of the leaves; and *Y. aloifolia*. Both are sometimes called Adam's, or Eve's, Needle and Thread. The latter is named

also Spanish Dagger. The Spanish Bayonet is the name given to several Mexican species, one of them, *Y. constricta*, extending to Tex. and Utah; another is the so-termed Mexican Banana, edible. The fibre of the *Yuccas* is similar to that of the *Agaves* and *Bromelias*, and probably is often included under the name *Pita Flax* or *Pita Fibre*.

YUDHISHTHIRA: see PÂN'D'AVAS.

YUFTS, n. *yŭfts* [Russ. *yuft*]: a kind of Russian leather, which, when well prepared, is of good red color, soft and pleasant to the touch, with an agreeable, peculiar odor.

YUGA, *yô'ga* [from Skr. *yuj*, join: kindred to L. *jung*-Gr. *zeug*-, Gothic *juk*; hence, literally, junction]: in Hindu mythology and astronomy, a long mundane period of years, preceded by a period called *Sandhyâ*, 'twilight,' and followed by a similar period called *Sandhyâm's'a*, 'portion of twilight.' Manu, the Mahâbhârata, and the Purân'as name four such periods, three of which have already elapsed—viz., the *Kr'ita*-, *Tretâ*-, and *Dwâpara-Yuga*; while the fourth, or *Kali-Yuga*, is that in which we live. The *Kr'ita-Yuga*, according to these works, consists of 4,000 divine years, its *Sandhyâ* of 400, and its *Sandhyâm's'a* likewise of 400 divine years. The *Tretâ-Yuga* consists of 3,000, and its *Sandhyâ* and *Sandhyâm's'a* of 300 divine years each; the *Dwâpara-Yuga* of 2,000 divine years, with 200 such years to its *Sandhyâ*, and 200 to its *Sandhyâm's'a*; and the *Kali-Yuga* of 1,000 divine years, with 100 such years to its *Sandhyâ*, and 100 to its *Sandhyâm's'a*. And since a divine year comprises 360 solar years of mortals, a year of men being a day of the gods, these Yugas, with their *Sandhyâs* and *Sandhyâm's'as*, would severally represent 1,728,000, 1,296,000, 864,000, and 432,000, or, in the aggregate, 4,320,000 solar years of mortals—a period called Mahâyuga, or 'a great Yuga;' 4,320,000,000 years being a day and night of Brahmâ: see KALPA. The notion on which the theory of these Yugas and their *Sandhyâs* and *Sandhyâm's'as* is based, as may be easily inferred from the foregoing statement, is that of a descending progression, 4, 3, 2, 1, each of these units multiplied by 1,000, and in the case of the periods preceding and following the Yuga, by 100 years. The deteriorating process thus indicated in the succession of these Yugas, is also supposed to characterize the relative physical and moral worth of these mundane ages. 'In the *Kr'ita-Yuga*,' Manu says, 'men are free from disease, attain all the objects of their desires, and live 400 years; but in the *Tretâ* and the succeeding Yugas their life is lessened gradually by one-quarter.'... 'In the *Kr'ita-Yuga*, devotion is declared to be the highest object of men; in the *Tretâ*, spiritual knowledge; in the *Dwâpara*, sacrifice; in the *Kali*, liberality alone.' For other passages, see KALIYUGA. The present or *Kaliyuga* of the world commenced in the year B.C. 3101.—The term Yuga is sometimes applied to other divisions of time; the Vishn'u-Purân'a, e.g., mentions, besides the Yugas above named, a Yuga which consists of a cycle of five years; and a Yuga, or cycle of five years, is in the astronomical treatises connected with the Vedas.



## YUKON—YUMAS.

**YUKON**, *yó'kón*, RIVER: river in Alaska, the largest on the Pacific coast of America; estimated more than 2,000 m. long. Its tributary streams are mostly among the mountains of n.w. Brit. America, the most southern rising about 58° 30' n. lat. and 131° 50' w. long. In its upper course it is known as the Tahco, and below this as the Lewis river. Its direction is northerly to near Fort Yukon in e. Alaska, and thence s.w. to Norton Sound, with which for a long distance it runs nearly parallel. It is said to discharge one-third more water than the Mississippi, but much of its broad swampy course is ill adapted to navigation. Its mouth forms a delta on low lands.—See **ALASKA: KLONDIKE**.

**YULAN**, n. *yó'lán* [Chinese]: in *bot.*, *Magnolia conspicua* (*M. Yulan*), a tree, native of China, where it is 40 or 50 ft. high, though in some western lands it seldom reaches more than 20 or 25 ft. It has large, brilliant snow-white flowers, shining forth from gray and naked branches early in spring before the leaves appear.

**YULE**, n. *yūl* [Icel. *jól*; Sw. *jul*; Dan. *juul*, the Christmas festival, a feast: AS. *geóla*, Yule: origin uncertain]: the Christmas festival; Christmas. **YULE-LOG** or **-BLOCK**, a large log of wood formerly brought in with much ceremony and placed on the hearth on Christmas eve. **YULE-TIDE**, the Christmas season.—The old name *Yule* points to heathen times, and to the annual festival held by the nations of n. Europe at the winter solstice as a part of their system of sun or nature worship. In the Edda, the sun is styled *fagrahvel* (fair or shining wheel); and a remnant of his worship, under the image of a fire-wheel, survived in Europe as late as 1823. The inhabitants of the village of Konz, on the Moselle, were in the habit, on St. John's Eve, of taking a great wheel wrapped in straw to the top of a neighboring hill, and making it roll down the hill, flaming all the way. The Old Norse *hvel*, AS. *hveol*, have developed into Icel. *hiol*, Sw. and Dan. *hjul*, Eng. *wheel*; but from the same root would seem to have sprung old Norse *jól*, Sw. and Dan. *jul*, AS. *geol*, Eng. *Yule*, applied as the name of the winter solstice, either in reference to the conception of the sun himself as a wheel, or, more probably, to his wheeling or turning back at that time in his path in the heavens. For the general nature of the festival, and the way in which the observances were overlaid or transformed and masked by the Christian institution, see **CHRISTMAS**. The burning of the *Yule-log* (or *Yule-clog*) testifies to the use of fire in the worship of the sun (see **BELTANE**).

**YUMAS**, *yó'máz*: tribe of Indians in Arizona and California, on the Colorado river, near its junction with the Gila, and in the neighborhood of the so-called Yuma City, on the S. Pacific railway. In 1890 there were 1,126 Indians, mostly Yumas, on the reservation that had been established here 1865. The Y. have fine physique, are natively docile and honest; but until recently have been left in their primitive indolence and ignorance, with no civilizing influences but a railway eating-house, a steamboat landing,

## YUNG WING.

and a territorial penitentiary. The men made bows and arrows; the women carried wood on their backs to the white settlement; the only clothing was a clout or a bark skirt; the food was the mesquite bean, river-fish, and a few vegetables or cereal grains; the houses a few adobe huts, but mostly booths of poles and brush; and the furniture but piles of sand. The tribe was and is monogamous. Half-breeds were scarce; which scarcity was accounted for by strangulation at birth. About 1885 Mary O'Neill and a band of Rom. Cath. sisters came and opened a school, which was opposed by the most of the tribe, and riotously treated by such of the children as could be induced to attend. In 1890 there were in the school 84 boys and 43 girls under good control; the men, women, and children were adopting civilized dress, and cultivation of the ground with irrigation had been introduced. A Spanish mission was begun 1780, but the missionaries were massacred the next year.

YUNG WING, *yǔng wǐng*: Chinese imperial commissioner: b. Nan Ping, China, 1828, Nov. 17. He received instruction from Samuel R. Brown, D.D., missionary of the Morrison Education Society; came to the United States 1847; graduated with high honor at Yale 1854, and afterward was in China, variously employed. He followed the tea and silk trade 1860-64. Brought favorably to the notice of the generalissimo of the imperial army, he was commissioned by the Chinese govt., 1864, to buy machinery for the Shanghai arsenal, and was made a mandarin of the fifth degree. In 1870, at the settlement of the massacre of Christians at Tientsin, he was called to meet the foreign high commissioners, and succeeded in carrying through there, and afterward with the imperial government, his long-contemplated plan for the education of selected Chinese students abroad. He was appointed chief commissioner to superintend at Hartford and elsewhere those sent to the United States. In 1876 he was appointed associate minister to the United States, Peru, and Spain; and he investigated the condition of Chinese laborers in Peru. In 1878 and afterward he was at Washington; and returned 1882 to China, having before this received the title of intendant (deputy) of the governor of the Kiang-su province. He had married in 1875 Mary Kellogg, of Avon, Conn., and, her health failing, he returned to Hartford; she died 1886. Yung Wing was from time to time promoted to mandarin of the third rank and the second. He acquired citizenship in the United States 1852. His scheme for the foreign education of Chinese youth, to care for the international interests of China, and to fill important posts at home connected with foreign relations, as well as to bring China in general up to modern progress, was conceived with far-seeing sagacity while he was in Yale College, and pursued with much patient waiting and against great difficulties for more than 20 years. When first adopted by the Chinese government, \$1,000,000 was appropriated to the object; the execution of it in the United States was known as the Chinese Educational Commission.



## YUNNAN.

YUNNAN, *yŭn-nán'*: province in s.w. China; bounded n.w. by Tibet and Burmah, n. by Sze-chuen, e. by Kweichow and Kwang-si, s. by Annam, Laos, and Siam; 108,000 sq. m. The name means 'South of the Clouds' [from *yun*, cloud, and *nan*, south], in allusion to the thick fogs which 'hang like a permanent dividing-line on the verge of the Sze-chuen highlands' on the n. The general character of Y. is that of an extensive, uneven, highland plateau; between the leading ranges of mountains which run north and south are numerous deep defiles, and fertile valleys through which run some large rivers. The Yang-tse Kiang skirts the n. border; and the s. is drained by tributaries of the Irrawadi, the Salwen, the Mekong, and the Songka, flowing through Burmah, Siam, and Tonquin. The soil is more fertile, the climate is milder (though often pestilential), and the land more thickly peopled in the s. than in the n., where fogs and mists prevail, and render the country almost uninhabitable. Minerals abound, and form the true wealth of the province, which yields abundance of copper, tin, zinc, and lead. Gold, silver, and cinnabar also are worked. Copper forms about three-fifths of the total annual metallic output, amounting to 12,000,000 to 13,000,000 catties a year (the catty =  $1\frac{1}{2}$  lbs. avoirdupois). Its export, however, is not free, as the mines are in the hands of the Chinese govt., which supplies the funds to work them, and reserves the right of buying the metals at a fixed rate. The greater part of the copper required throughout the empire for coinage of 'cash' is obtained in Y. Lead, zinc, and tin also are actively worked. In 1877 the annual output of tin is said to have represented a value of about \$600,000. The other products of Y. are tea (a highly prized variety of which is called *puh-ŭrh cha*, from the city of *Puh-ŭrh*), opium, and medicinal plants. The most practicable trade-routes are by the Yang-tse from Shanghai, by the Canton river from Canton, and in the w. by the route from Burmah by Bhamo, on the Upper Irrawadi. Since 1836 there have been various attempts by the British and French governments, and by private travellers, to penetrate to Y. from the s., and open a trade-route from the Indo-Chinese peninsula, through Burmah, the Laos country, or Tonquin. In 1875, Feb., an expedition sent by the govt. of India to explore a new trade-route into China by way of Burmah was driven back, and A. R. Margary, of the Brit. consular service, who had been sent from Peking to meet and conduct the party to the capital, was murdered at Manwyne, within the frontier of Y. This, usually styled the 'Yunnan Outrage,' led to the signing of the Chefoo Convention in the following year. Colquhoun and Wahab journeyed 1882 from the Canton river to the Irrawadi, and saw a large tract of south Y. hitherto unexplored. In the unexplored recesses of Y., branches of the great Mongolian stock meet and mingle with the Burmese, Tai, Tibetan, Mon-annam, and other races. In 1855 the Mohammedans of Y. asserted their independence, and for a few years maintained it against China; but on the reconquest of the territory by the Chinese, and the murder of the Moham-

## YUTHIA—YWIS.

medan ruler, the empire of the Panthays (q.v.) became extinct. These civil conflicts have been disastrous to the country. The cap., Yunnan-fu, on the n. shore of Lake Chin, has considerable trade.—Pop. of province 5,561,320.—See Anderson's *Mandalay to Momiën* (1876), and Colquhoun's *Across Chrysê* (1883).

**YUTHIA**, *yôt'hê-á*, or **AYUTHIA**, *á-yôt'hê-á*: city, former cap. of Siam, founded 1350. It is on the Meinam river, 40 m. above the present cap., which became the residence of the kings after Y. was destroyed during an invasion by the king of Ava, in Burmah. The town was rebuilt, and again became populous. Near it is a pyramid 400 ft. in height, called the Golden Mountain, and containing a huge statue of Buddha, of gold or gilded, in a vault that is said to be 150 ft. high. Little remains to indicate the former royal magnificence of the city, which is now a health resort of many from Baugkok during the summer.—Pop. 30,000 to 40,000.

**YVERDUN**, *ê-vêr-dűng'*, or **YVERDON'**, *-dűng'* (German, *Iferten*): well-built, industrious town in the Swiss canton de Vaud; 25 m. n. of Lausanne. It is an important railway centre. The old castle, built 1135, was used by Pestalozzi as an educational institute; and at Y. the great French *Encyclopédie* was published.—Pop. 6,000.

**YVETOT**, *êv-tô'*: old town of France, dept. of Seine-Inférieure; on an elevated and fertile plain, 23 m. n.w. of Rouen. There are manufactures of linen, cotton, calico, and velvet, and a considerable trade in cattle and agricultural produce. The town and territory of Y. was long a sovereign principality (till 1681), and the Lord of Y. was popularly styled 'Roi d'Yvetot.'—Pop. of town 8,000.

**YVON**, *e-vűng'*, **ADOLPHE**: French painter: b. Eschweiler, Lorraine, 1817. He was a pupil of Paul Delaroche, and painted the figure with great success in all departments—portrait, genre, and history, especially the last. Beginning with 1846, his subjects include *The Remorse of Judas*, *The Battle of Kolikova*, *The First Consul descending the Alps*, *Ney supporting the Rear Guard in Russia*, *The Capture of the Malakoff*, *The Battle of Solferino*, and *Magenta*. Other subjects are *The Fallen Angel*; and *The Seven Deadly Sins*, after Dante.

**YWIS**: see **IWIS** and **WIS**.



# Z

**Z, z, zē** (in the United States), *zēd* (in the United Kingdom): a consonant, the 26th and last letter of the English alphabet. *Z* had no place in the original Latin alphabet, but was adopted in the time of Cicero from the Greek with *γ* (*ν*), and thus stood last. In the Phœnician it stood 7th. In Greek it had the 6th place, and had the power of a double consonant, being equivalent to *ds* or *sd*; in Latin its use was confined to words of Greek origin. In High Ger., in which it is pronounced like *ts*, it corresponds to *t* in the Low Germanic and the Scandinavian tongues—e.g., *zeit* = Eng. *tide* (time). In It. *z* or *zz* mostly takes the place of the L. *ti*, as in *negozio* = *negotium*, *palazzo* = *palatium*, and is pronounced *ts*, or, preceded by *n*, *ds*. In English and in French it represents the flat sibilant sound of which *s* is the sharp. But in English, as in the majority of cases *s* has always been employed to represent the flat sibilant sound as well as the sharp (e.g., in almost all plurals, as *bones*, *cards*, in words like *revise*, etc.), there is a tendency to drop the use of *z*, except in a few individual words, such as *size*, *prize*. Many maintain the use of *z* in words derived from the Greek, especially from verbs in *izō*, as *baptize*, as well as in words formed on the analogy of these, as *legalize*. *Z* is sometimes doubled, as in *nozzle*, *buzz*, etc.

**ZA**, n. *zá* [from the sound]: the seventh harmonic, as heard in the horn or Æolian string. It corresponds to B-flat.

**ZAANDAM**, *zân-dâm'*, or **SAARDAM**, *sâr-dâm'*: town in N. Holland, on both banks of the Zaan, at its entrance into the Ij (a deep and narrow bay of the Zuider Zee), now converted into land intersected by canals, bearing rich crops. *Z.* is 5 m. n.w. of Amsterdam, on the other side of the bay. In former times, ship-building was largely carried on, but has nearly ceased. The whale-fishing, which 1701 employed 35 ships, has been abandoned. There is still considerable shipping-trade. The principal industries are sawing wood, preparing vegetable oil—chiefly from colza—manufacturing paper, grinding grain, mustard, dye-stuffs, snuff, etc., making starch, rope-spinning, and iron-founding. At a distance the town looks like a forest of wind-mills. *Z.* is a pleasant place, and many of the inhabitants are reputed to be wealthy. In 1697 Peter the Great worked in one of the ship-building yards as a carpenter, and the house in which he lived is carefully preserved. It was visited 1814 by Emperor Alexander of Russia, and is now inclosed with another building, to prevent exposure

## ZABERN.

to the weather. There are two Dutch Reformed churches, one Lutheran, two Bapt., and two Rom. Cath. churches, a Jewish synagogue, and several institutions for orphans and old people. Two public schools, a school of design, and two poor-schools are maintained by the town.—Pop. (1880) 13,171; (1887) 14,351; (1901) 22,022.

ZABERN, *tsâ'bĕrn* (the Roman *tabernæ*, tavern): name of three German towns on the w. side of the Upper Rhine, one of which was French till 1870. The first two are in the Palatinate (Rhenish Bavaria)—viz., BERG-ZABERN, on the Erlenbach, occupied chiefly with agriculture and some small manufactures; pop. about 3,000: and RHEIN-ZABERN, about 4 m. further e., on the same stream, noted for two battles there and at the village of Jokgrin, about 2 m. further s., between the Austrians and the French, 1793, June 29 and Aug. 20; pop. about 2,000.

The other, for distinction called ALSACE-ZABERN (French *Saverne*), till the war of 1870 in the French dept. Bas-Rhin, is now cap. of a circle in the German imperial territory Alsace-Lorraine. It is on the Zorn, which flows into the Rhine, on the Paris and Strasburg railway and highway, also on the Marne and Rhine canal. The town contains a palace and college. Its industries are the making of cloth, pottery, leather, and hardware, and transport of wood from the Vosges Mts. It belonged in the 12th c. to the bishops of Metz, and afterward to those of Strasburg. There are still some Roman antiquities in the college. In 1696 the fortifications were razed. The stately palace was rebuilt by Cardinal Louis de Rohan, famous in the story of the Diamond Necklace (q.v.); it served 1817,8 as barracks for the Austrian army of occupation; 1852 it became a home for the widows and daughters of the members of the Legion of Honor; and now it is again a barrack. The surrounding scenery is rich in ruins and picturesque effects. A spiral walk, the Zabern Path, about 9 m. long, leads, with many windings and 17 covered bridges, to the top of the Vosges, from which the spectator looks down on Alsace as a garden. The Pass of Zabern, or Saverne, which divides the Upper and Lower Vosges, is only 1,325 ft. high. The railway, the canal, the Zorn, and highway, all run side by side along the charming valley; and there is a constant succession of bridges, embankments, viaducts, and tunnels throughout the 45 minutes' journey from Z. to Saarbourg.—Pop of town about 6,600.



## ZABISM.

ZABISM, *zābīzm*: religious system of the Sabæans. The article on SABEANS (q.v.) treats chiefly of certain inhabitants of Arabia Felix, the 'Sabaioi' of the Greeks, or 'Sabæi' of the Romans. It appears that this name was, in the 4th c. after Christ, superseded by that of Himyarites, and belonged to many tribes, that derived their descent from one Sabâ ('a descendant of Eber, or descendant of Noah'), who was called also Abd Shemesh—Servant of the Sun. These Sabæans, who considered themselves pure autochthons, in distinction from the immigrated tribes, have often been confounded with a number of other peoples of antiquity, and with professors of many forms of religious belief and speculation; in fact, the confusion that has sprung out of the unwieldy mass of information found respecting these many varieties, which information has been hopelessly mixed by many generations of orientalist and theologians, is almost without parallel. We shall not here survey the manifold systems and theories evolved from time to time, and handed down carefully; but we shall rather—in the main following Dr. Chwolson—enumerate the principal stages of Z. as it appears, considered as a religious phase of mankind. We premise that we exclude those imaginary Zabians who were taken by the mediæval Arabic, Jewish, and Persian writers to be identical with heathen or star worshippers, as well as those who, like the ancient Chaldæans, the ante-Zoroastrian Persians, the Buddhists, etc., were vaguely called Zabians by Mohammedan and other writers of the 12th c. These writers all start from the notion that idolatry, star-worship, and Sabæism were identical, and they called nearly all those who were neither Jews or Christians, nor Mohammedans or Magians, heathens or Sabæans. Z. had then become, like Hellenism, from being a *nomen gentile*, an appellative.

Confining ourselves to historical Z., we have to distinguish (1) the Chaldæan Zabians of the Koran. These are the 'Parsified' Chaldee heathens or non-Christian Gnostics—ancestors of the present Mendaïtes, or so-called Joannes Christians, who live not far from the Persian Gulf, and speak a corrupt kind of Chaldee-Aramaic. (2) The Pseudo-Zabians, or Syrian Zabians (in Harran, Edessa, Rakkah, Bagdad), or, since 830–1, remnants of the ancient Syrian but Hellenized heathens. These disappear (as Zabians) since the 12th c., but perhaps still exist, under some other name, in Mesopotamia. These Pseudo-Zabians spoke the most refined Syro-Aramæan dialect, and form the chief representatives of Z. emphatically deserving of the name. Those previously named, the Chaldæan (Babylonian) Zabians, who transferred that name to the Harranic Zabians, and were of great influence on the development of peculiar speculations of the latter, are the people meant under that designation by the Koran, and by the Mohammedans of this day. They are known also as Christians of St. John, or Mendaïtes. Among the Nabathean heathens of n.e. Arabia and the extreme s. of Mesopotamia, near Wasith and Bassra, there arose, in the last decennium of

## ZABISM.

the 1st c. after Christ, a man named Elxai (Elchasai = Scythianus), born in n.e. Parthia (probably an adherent of Zoroastrianism, perhaps also acquainted with Buddhism), and spread among them Parsee ideas and Parsee religious rites and customs. They called themselves Mendaïtes—i.e., Gnostics. Many of their religious legends and tales they adopted at a later period from their Jewish and Mohammedan neighbors—chiefly, it is presumed, with a view of making themselves less hated by the ruling Mohammedan powers. They received the name of Ssabiin from their constant washings and purifications and baptisms. Their Arabic neighbors occasionally translated this word into the Arabic *Al-Mogtasilah*, ‘those who wash themselves.’ About a hundred years after the foundation of this sect by Elchasai, Manes was born of Mendaïte parents, and was brought up among the Mendaïtes. He remained faithful to this creed till his 24th year, at which period he founded the new sect of Manicheans, which did not at first depart so considerably from Mendaïsm as it did at a later period (see MANICHEAN). To these aboriginal Zabians there succeeded 830 a totally different sect under the same name—viz., the Harranian Syrians. They themselves derived their denomination from one Zâbî, who is variously called a son of Seth, son of Adam, or a son of Enoch or Idris, or a son of Methuselah, or of some fictitious Badi or Mari, a supposed companion of Abraham; while the Mohammedan writers, who, like the Greeks, endeavor to derive everything from their native tongue, declare it to be derived from *ssaba*, ‘to turn, to move,’ either because they turned to the paths of untruth, instead of that of the true religion—i.e., Islam; or, as the Zabians themselves sometimes explain it, ‘because they have turned to the proper faith.’ Another Arabic derivation makes them take their name, still more absurdly, from a root *ssabaa* = to fall away from the proper religion, or to turn one’s head heavenward—i.e., for the purpose of worshipping the angels and the stars, etc. European scholars mostly have followed either Brooke or Scaliger, who variously hold the name to have sprung either from an Arabic root, which would point to their having come from the ‘east,’ or from the Hebrew word for ‘Host,’ viz., of heaven, which they were supposed to worship. The real state of the case, however, is that, whatever the derivation of the name, it did not belong originally to the Harranians, but was assumed by them, for the purpose of evading the Mohammedan persecutions, from the people mentioned in the Koran.

But it is not easy to say who these so-disguised Harranians really were; and what, since it was neither Judaism, nor Christianity, nor Mohammedanism, nor Magism, their religion really consisted of. Former investigators mostly took them to have been a distinct race and people, and their religion to have been composed of Chaldaism, Parseeism, Judaism, Christianity, Neo-Platonism, Gnosticism, and Cabbalistic speculations. This, however, is far from being the fact. Broadly speaking, they might perhaps best



## ZABISM.

be described as Syrians, who, partly descended from Greek colonists, had been subject so long to Syrian influences that they became in a manner Syrianized. Their religion was heathenism, the old heathenism of their Syrian fathers, which had, with incredible obstinacy, resisted not only Christianity, but rendered even Mohammedan ill-will harmless by stratagem. There can, however, be no doubt about certain foreign non-pagan elements having crept into it during the early Christian centuries. Eclecticism prevailed at that period, and it was not only Greeks and Romans that found the influence of foreign, chiefly Eastern, metaphysical speculation irresistible. But apart from that peculiar syncretism, we find in Zabism many other additions to Harran idolatry. There are, first of all, a certain number of legends about biblical personages from whom they pretend to be descendants—legends which, it may be presumed, they only for the nonce permitted to belong to their sacred traditions. There are further a number of laws of purity and impurity, and of sacrifices, which strongly remind of Judaism. Again names of Greek and Roman gods, such as Helios, Ares, and Kronos, occur—a fact that perhaps may be explained from the prevailing tendency of the period of exchanging the names of native divinities for Greek and Roman names. Besides these foreign elements there are certain metaphysical and physical views incorporated in their creed which are distinctly traceable to Aristotle, and, finally, the theurgico-Neo-Platonic religious philosophy of heathenism, such as it is found in Porphyry, Proclus, Iamblichus, and the rest. All these apparently incongruous elements, however, infused into it by the circumstances of the period, do not prevent Z. from being in reality heathenism. Were further proof needed, we should find it in the words of a celebrated Zabian, Thabit ben Korra, quoted by Barhebræus, in the shape of a panegyric on the town of Harran and its heathenism, uttered, as Barhebræus says, in his ‘purblind obstinacy.’ After speaking of Christianity—not to its advantage—Thabit rejoices over the blessings that still belong to his native place, Harran, through its having kept itself utterly unsullied by that faith. ‘We,’ he continues (the Zabians or Harranians), ‘are the heirs and progenitors of heathenism, which has once been gloriously spread over this globe. Blessed is he who bears his burden for heathenism’s sake, with firm hopes. Who has civilized the world and built its cities, but the noble and the kings of heathenism? Who has constructed the harbors and has made the rivers navigable? Who has taught the hidden science? To whom else has the deity revealed itself, given oracles, and told the things of the future, but to the most celebrated men among the heathen?... Heathens have done all these things. They have brought to light the healing of souls; they have taught their salvation; they have also made manifest the art of healing the body; they have filled the world with institutions of government and with wisdom, which is the highest good. Without heathenism, the world would be

empty and poverty-stricken, and swallowed up by great misery.'

Without entering into detailed account of the many sources whence our information is derived with regard to the creed itself, we note that they are written in Arabic, in Hebrew, and in Greek. The former are the most copious; those in Hebrew are represented chiefly by Maimonides; and the Greek are ascribed to various pseudonymous writers, among whom figure Aristotle and Hermes Trismegistus. From their various, and, to a great extent, contradictory statements, we owe the following indications regarding the principal points of this creed: The Creator, it teaches, is in his essence, primitivity, originality, eternity, One; but in his many manifestations in bodily figures, manifold. He is personified chiefly by the seven leading planets, and by the good, knowing, excellent, earthly bodies; but his unity is not thereby disturbed. It is, the Zabbians say, 'as if these seven planets were his seven limbs, and as if our seven limbs were his seven spheres, in which he manifests himself, so that he speaks with our tongue, sees with our eyes, hears with our ears, touches with our hands, comes and goes with our feet, and acts through our members.' Nothing, we are told, is more foreign to Z. than—what holds true of the creed of the Sabæans only—rude star-worship. Z., according to the authority of Sharastani, expresses the idea that God is too great and too sublime to occupy himself directly with the affairs of this world; that he therefore has handed over the ruling of it to the gods, and that he himself takes only the most important things under his special care; that, further, man is too weak to address himself directly to the Highest, that he therefore is obliged to direct prayers and sacrifices to the intermediate deities to whom the rule of this world is intrusted. Thus the veneration shown to planets, and even the worshiping of idols, is nothing but a symbolical act, the consequence of that original idea. There are many gods and goddesses in Z. of this intermediate stamp. It is not the planets themselves, but the spirits that direct and guide them and deliver them, which are taken as deities of this kind—deities that stand to the spheres in the relation of soul to body. Apart from these, are those gods who cause or represent every action in this world. Every universal natural deed or effect emanates from a universal deity, every partial one from a partial deity that presides over part of nature. Everything that appears in the air, which is formed near the sky or arises from the earth, always is the product of certain gods, that preside over these manifestations, in such a manner that the rain in general, as well as every special drop of it, has a presiding numen. These spirits also mold and shape everything bodily from one form into the other, and gradually bring all created things to the state of their highest possible perfection, and communicate their powers to all substances, beings, and things. By the movement and guidance of these spiritual beings, the different elements and natural compositions are influenced in such a way that the tenderest plant may pierce the hardest cliff.



He who guides this world is called the first spirit. These gods know our most secret thoughts, and all our future is open to them. The female deities seem to have been conceived as the feeling or passive principle. These gods or intelligences emanate directly from God without his will, as rays do from the sun. They are, further, of abstract forms, free of all matter, and neither made of any substance nor material. They consist chiefly of a light in which there is no darkness, which the senses cannot conceive by reason of its immense clearness, which the understanding cannot comprehend by reason of its extreme delicacy, and which fancy and imagination cannot fathom. Their nature is free from all animal desires, and they themselves are created for love and harmony, and for friendship and unity. They are not subject to local or temporal changes, and they rule the heavenly bodies without finding the motion of the most heavy too heavy or that of the lightest too light. Their existence is full of the highest bliss, through their being near to the Most High, whom day and night they praise, without ever feeling fatigue or lassitude, to whom they are never disobedient, but whose will they always fulfil with supreme delight. They have a free choice and always incline to the good. 'These spiritual beings, our lords and gods, are our intermediators and advocates with the Lord of lords and God of gods.' All substances and types of the bodily world emanate from the spiritual world, which is the one from which everything flows, and to which everything returns, and which is full of light, sublime and pure. These two worlds correspond to each other, and are to each other like light and shadow. The way to approach these gods, and, through them, the highest essence, is by purifying our souls from all passions, by keeping a strict guard over our words and deeds, by fasting, heartfelt prayer, invocations, sacrifices, fumigations, and incantations. By steadfastly persevering in these and similar acts of devotion, man may reach so high a step of perfection that he may communicate even directly with the Supreme Power. The planets, as the principal representative and intermediate gods, are to be carefully observed, especially as regards—1, the houses and stations of the planets; 2, their rising and setting; 3, their respective conjunctions and oppositions; 4, the knowledge of the special times and seasons, the hours and days of the ruling of special planets; 5, the division of the different figures, forms, climates, and countries, according to their dominant stars—the prevailing notion of the Zabians being, like that of the Chaldees and the sect of the so-called Mathematicians (according to Sextus Empiricus), as well as of the Neo-Platonists in general, that everything below heaven was subject, in a manner, to the influence of stars, or the spirits that inhabit and rule them. Every substance and every action, every country and every hour, has its special planetary deity. It is therefore well to study carefully the special conjunctions and figures, as well as the special mixtures of incense, which might cause the individual numen to be propitious. Thus, e.g., according

to the Zabian belief, the first hour of Saturday stands under Saturnus, and it is therefore right and advisable to select at that time such prayers, seals, amulets, dresses, and fumigations as may be supposed particularly pleasing to that planetary god.

In order to address themselves to *visible* mediators, some of the Zabians are supposed to have directed their devotions to the stars themselves. But they soon found how futile a worship it was that addressed itself to things that appeared and disappeared in turn. They therefore manufactured permanent representatives of them in the shape of idols—idols wrought in as complete accordance as possible with the theurgical rules derived from the nature of the deity to be represented. They were of gold, to represent the sun; of silver, to indicate the moon. The very temples in which they were placed were of as many corners as were supposed to correspond to the form of certain stars.

We know but little of the cosmogonical notions of the Zabians. Sharastani, one of our principal authorities, only quotes 'Agathodæmon' as his authority for their assuming five primeval principles—viz., the Creator, Reason, the Soul, Space, the Vacuum. Out of these, all things are composed. According to another source (Kathibi), however, the Zabians assumed two living and active principles—viz., God and the Soul; further, a passive one, Matter; finally, two which are neither living nor passive—viz., Time and Space. Matter seems to have been held by them to be primeval and everlasting, and to it alone the existence of evil is attributable. God created the spheres only and the heavenly bodies therein. It is these spheres (fathers) which carry the types or ideas to the elementary substances (mothers), and out of the combination, conjunction, and motion of these spheres and elements the varying earthly things (children) are produced. Matter is, as we said, because of its defective nature, the source of evil, of ignorance, of folly; while the form is the source and fountain-head of the good, the right, the knowledge, and the understanding. Z. further assumes a renewal of this world after each great 'world-year'—a space of 36,425 ordinary years. At the end of these periods, the plants, the animals, and the men that had existed within it, cease to propagate themselves, and a generation of each of them, different from all previous ones, springs into life. How far this theory is identical with the Babylonian, Egyptian, and Indian theories on the same subject, we cannot here investigate; suffice it to call attention to the striking likeness apparent in them all.

Man, the Zabians teach, is composed of contradictory elements, which make him the vacillating, struggling creature that he is. Passions and desires rule him, and lower him to the level of brute creation, and he would utterly lose himself were it not for such religious rites as purifications, sacrifices, and other means of grace, by which he may be enabled to approach the great gods once more, and to attempt to become like unto them. There are different kinds of souls; or rather man's soul partakes partly of the



nature of the animal soul and partly of that of the angelic soul. The soul never dies, and punishments and rewards will affect only it, but not everlastingly. But rewards and punishments will be wrought not in any other or future world, but in this; only at different epochs of existence. Thus, all our present joys are rewards for good deeds done by us in former epochs; and the sorrows and griefs that we endure spring in the same manner from our evil actions at former stages. As to the nature of the general (world-) soul itself, they say that it is primitive, for if it were not so, it would be material, as every newly created being partakes of the material nature. Yet a material soul would be an impossibility. 'The soul, which is thus an immaterial thing,' says Kathibi, 'and exists from eternity, is the involuntary reason of the first types, as God is the first cause of the intelligences. The soul once beheld matter, and loved it. Glowing with the desire of assuming a bodily shape, it would not again separate itself from that matter of which means the world was created. Since that time the soul forgot itself, its everlasting existence, its original abode, and knew nothing more of what it had known before. But God, who turns all things to the best, united it to matter, which it loved, and out of this union the heavens, the elements, and other composite things arose. In order that the soul might not wholly perish within matter, he endowed it with intelligence, whereby it conceived its high origin, the spiritual world, and itself. It further conceived through it that it was but a stranger in this world, that it was subject to many sufferings in it, and that even the joys of this world are but the sources of new sufferings. As soon as the soul had perceived all this, it began to yearn again for its spiritual home, as a man who is away from his birthplace pines for his homestead. It then also learned that, in order to return to its primitive state, it had to free itself from the fetters of sensuous desires, and from all materialistic tendencies. Free from them all, it would regain its heavenly sphere again, and enjoy the bliss of the spiritual world.'

From all this it will be seen, as we stated at the outset, that the Zabians, about whom so much has been theorized and fabled, were simply heathens who had to a certain extent adopted and modified Neo-Platonic ideas such as floated in the mental atmosphere of the early Christian centuries. It would be needless to enter into a discussion about the semi-fabulous personages to whom they ascribe the foundation of their creed, such as Agathodæmon, Arani, Hermes, and the rest; or some of those mentioned by other writers, such as Zerdusht, Nawassib, Orpheus, and the rest.

The life of this sect was short. After having been first on terms of great friendship with the ruling powers of Mohammedanism as well as with Christians and Jews, and having filled many of the highest and most responsible posts at the courts of the caliphs, they were by degrees made the butt of fanaticism and rapacity. Mulcted, persecuted, banished at different periods, they disappear from history since the middle of the 11th c. Some obscure remnants

## ZABRUS—ZACATECAS.

seem to have survived in remote corners of Mesopotamia, but they, too, no longer adhere to the original creed, but are mingled with the Mendaïtes, mentioned above, and the Shemsijeh, or sun-worshippers. Thus obscurely ended a sect which, for 200 years, had produced a host of men pre-eminent in every branch of learning and literature, in philosophy, astronomy, history, natural history, poetry, medicine, etc. Many of these men, whose name and fame reached Europe, were confounded with their Mohammedan contemporaries, chiefly because they lived in Bagdad, at that time the centre of learning, the seat of the caliphs and the high dignitaries of state. The Mohammedans, however, had so high an appreciation of Zabian learning, that it became proverbial among them, and they could explain it only by tracing it to a supernatural source, notably to Hermes (Trismegistus), father of the Zâbî, mentioned above.

We have in our sketch mainly followed Chwolson, who, aided by profound learning and acumen, has been the first to clear up the nature of Z., this stumbling-block of generations of investigators.—For detailed information on it and the many other points connected with it, see his large work, *Die Ssabier und der Ssabismus* (2 vols. St. Petersburg 1856).—See NEO-PLATONISM: Gnostics.

**ZABRUS**, n. *zā'brūs* [Gr. *zabros*, voracious]: in *entom.*, a genus of *Carabidæ*, sub-family *Pterostichinæ*. *Z. gibbus* is a broadly oblong beetle of dark-bronze color, abundant in parts of Europe.

**ZABUCAJO-NUTS**, n. *zā-bū-kā'jū-* [native name]: in *bot.*, the fruit of *Lecijthis Zabucajo*, a S. Amer. plant. The nuts, two inches long and one broad, inclosed in urn-like fruits, are exported and eaten.

**ZACATECAS**, *zāk-a-tā'kās*: inland state of Mexico, mostly between lat. 21° 31' and 24° 50' n., and long. 100° 10' and 103° 40' w.; bounded n. by Coahuila, e. by San Luis Potosi, Aguas Calientes, and Jalisco, s. by Jalisco, w. by Jalisco and Durango; 25,227 sq. m. It is one of the most mountainous states of the republic. It is traversed by a branch of the Sierra Madre Mountains, and on the w. are several spurs of this range. It is watered only by mountain streams, and its fertile regions are principally in the valleys. The climate is generally healthful, cold in the elevated portions, warm in the valleys. It is rich in silver mines; and mining is the principal occupation, though agriculture is extensively carried on in the fertile districts. It formerly ranked first as a silver-producing state, but is now second to Guanajuato. Zacatecas, the cap., is also the chief city. Pop. (1892) 526,066; (1900) 462,886.

**ZACATE'CAS**: city, cap. of the Mexican state of Z.; in the windings of a deep valley or ravine, between high hills, about 340 m. n.w. of Mexico, on the great Mexican table-land, 7,976 ft. above sea-level. It is built over a vein of silver, which has been deeply explored: 12 mines not far from the centre of the town have been worked for more than 300 years. The streets are narrow and crooked, but it has a fine appearance from a distance, from the size and



## ZACHARIAS—ZAGAZIG.

massiveness of its churches, and the elegance of some of its residences. It has a college, a gunpowder-mill, a mint (which 1772–1865 coined silver money to the amount of about \$200,000,000), the govt. palace, and the cathedral. The water-supply is by a large aqueduct.—Pop. (1886) 46,000; (1892) 60,000.

**ZACHARIAS**, *zák-a-rí'as*, SAINT, Pope of Rome (pope 741–752); died 752, Mar. 14. He was a Greek by birth, and successor of Gregory III., and is noticeable as one of the series of Greek prelates by whom the destinies of Rome and Italy were much influenced in the 7th and 8th c. Z. deserves honorable mention in connection with a work of benevolence, which the Roman Church afterward consecrated by intrusting it to a special religious order—viz., the redemption of captives from the pagan masters by whom they had been held in slavery. During the troubles arising out of the Lombard invasion, Z., by his interposition in more than one instance in favor of the city of Rome with the Lombard kings, contributed to that prestige of the Roman see which eventually led to its obtaining the leadership of Italy, and in the end the temporal sovereignty of Rome and the adjoining territory. He died at Rome.

**ZADONSK**, *zá-dŏnsk'*: town of Russia, govt. of Voronej; 50 m. n. of the town of Voronej, about 230 m. s. of Moscow; on the left bank of the river Don. The trade of the town is not extensive, owing to the close neighborhood of the commercial towns Eletz and Voronej. The manufactures are insignificant. Z. possesses a renowned cloister.—Pop. 9,100.

**ZAFARAN-BOLI**, *zá-fá-rán'bŏ'lē*: town of Asia Minor, in Anatolia; about 190 m. e.n.e. of Scutari, at the junction of two small affluents of the Chati-su. It has four handsome mosques, a church, large baths and khans, and extensive suburbs. It has considerable trade in saffron (whence its name), which is cultivated extensively in the surrounding country.—Pop. supposed about 15,000.

**ZAFFRE**, n. *záf'fèr* [F. *zafre*; Sp. *zafre*; Ger. *zaffer*, *zaffre*; connected with *sapphire*]: the impure oxide of cobalt, which, melted with silica and potash, and reduced to powder, becomes the *powder-blue* of commerce. *Zaffre* is made by roasting cobalt ore and reducing it to powder, with addition of about three parts of the finest white sand used by glass-makers. It is extensively prepared in Saxony. When fused into a glass, it is intensely blue, and is much used by enamellers and porcelain manufacturers as a blue color.

**ZAGAZIG**, *zá-gá-zēg'*: commercial town in Lower Egypt, cap. of the province of Sharkieh; at the junction of several railroads, one of which connects it with Suez, 75 m. s.e. It is connected also with Ismaïlia and Suez by the sweet-water canal, whose construction increased its commerce. It is the principal depot for the cotton produced in the e. delta of the Nile. The ruins of the ancient city of Bubastis are near it.—Pop. (1882) 19,000.

## ZÄHRINGEN—ZALEUCUS.

**ZÄHRINGEN**, *tsä'rîng-ên*: small village near Freiburg, in Baden; in the Breisgau, formerly a province of Austria, but annexed to Baden 1805. It is historically noteworthy for the ruined castle from which the Dukes of Zähringen took their name, the ancestors of the reigning House of Baden (q.v.). The Hapsburgs (q.v.) are traced to the same stock. Guntram or Gunthrun the Rich, Count of Breisgau—son of the famous Erchanger, who raised himself to the dignity of Duke of Swabia and was beheaded for treason 917—is assumed as the founder of the House of Zähringen. The Zährings claim to be descended from his eldest son, Gebhard; the Hapsburgs, from the younger, Langelin. After the death of Duke Berthold I., 1077, the house was divided into two lines—the ducal or Zähring line, which became extinct in the male line 1218, with Berthold V., the founder of Berne; and the markgraf or Baden line, from which the present House of Baden is descended. The ducal Zährings exercised a beneficent sway over a great part of Switzerland.

**ZAI'RE**: see CONGO.

**ZAITÛN**: see CHINCHEW.

**ZAKRZEWSKA**, *zâkr-zhěv'skâ*, **MARIA ELIZABETH**, M.D.: physician: b. Berlin, Prussia, 1829, Sep. 6; of Polish descent. She studied medicine at a college in Germany, became an assistant and later a teacher in it, but could receive no degree from it; and 1853 she came to the United States and graduated at the Cleveland Medical College. With Elizabeth and Emily Blackwell she established the New York Infirmary, and for two years was its resident physician and manager. In 1863 she removed to Boston, and has since founded the New England Hospital for Women and Children in that city.

**ZALEUCUS**, *za-lû'kûs*: lawgiver, B.C. 664, of the Epizephyrii, a Greek colony named from a promontory near which they settled in the s.w. extremity of Italy, 15 m. s. of the present town of Crotona. They were a branch of the Locri tribe of Greece. To remedy the disorders of the colony, the oracle at Delphi directed that laws should be established; and Z., of whom nothing is known except conflicting traditions, pretended to have received a code of laws from the goddess Minerva. The laws were severe, so far as anything is known of them; adultery was punished by the loss of the offender's eyes. Any one proposing a new law was obliged to do so with a rope around his neck, and he was strangled if his proposition was rejected. It is claimed that the code was the first reduced to writing by any Greeks. Z. is said to have given up one of his own eyes to save one eye of his son, who had broken the law of chastity. He is said even to have slain himself at last for a violation of his own laws, though other tradition relates that he died in battle. The code existed till the historic period. The colonial town continued to the 6th c. after Christ, but disappeared in the middle ages.



## ZALINSKI.

ZALINSKI, *zǎ-lin'skǐ*, EDMUND LOUIS GRAY: soldier: 1849, Dec. 13— ————; b. Kurnick, Prussian Poland. Having removed to the United States 1853, he attended school in Syracuse, N. Y., graduating 1863. During the civil war he entered the Union army at the early age of 15, as volunteer aid-de-camp on the staff of Gen. Nelson A. Miles, and was afterward commissioned 2d lieut. in the 2d N. Y. heavy artillery, for gallantry at the battle of Hatcher's Run, Va. He remained on Gen. Miles's staff until the close of the war; was mustered out of the service 1865, Sep., and recommended for appointment in the regular army; was commissioned 2d lieut. in the 5th U. S. artillery 1866, Feb. 23, and became capt. by regular promotion 1887, Dec. 9. From 1872 to '76 he was on duty in Boston as prof. of milit. science at the Mass. Institute of Technology. He is noted for various inventions, especially in connection with the development of the Pneumatic Dynamite-gun (q.v.).

## ZAMA—ZAMBESI.

**ZAMA**, *zā'ma*: city and fortress in Numidia, about 300 m. s.w. of Carthage, near which Hannibal was defeated by the Younger Scipio, B.C. 201. The flower of Hannibal's forces consisted of a small veteran army that had shared his fortunes for many years; most of the rest were of inferior quality, of many races, variously organized, and of dubious fidelity. But his greatest deficiency was in cavalry, an arm with which he had repeatedly decided the victory in former battles. In Scipio's army, on the other hand, Numidians, under Masinissa, were present in overwhelming numbers. The onset of Hannibal's elephants, of which he had 80, was defeated and made worse than useless by the wise precautions of Scipio; the cavalry on his flank were scattered by the furious charge of Masinissa and Lælius; his front line of mercenaries beaten back by the more numerous and better-disciplined Romans. His veteran infantry, hemmed in on all sides, fought with the courage of despair, and were cut to pieces. Hannibal having, both before and during the battle, done everything which could secure the victory, escaped with a few horsemen. Of the Carthaginians, 20,000 were left dead on the field, and an equal number taken prisoners. Of the victors, 2,000 fell in the action.

**ZAMACOÏS**, *thá-má-kō'ēs*, **EDUARDO**: Spanish genre painter: 1837–1871, Jan.; b. Bilboa. He studied art at Madrid; also in Italy, and, under Meissonier, at Paris; and became one of the leaders of the new Spanish school. Among his best-known pictures are *The Hunchback*, *Diderot and D'Alembert*, *Cervantes as a Recruit*, *The Bull Fighters*, *A Court Jester of the Sixteenth Century*, and *The King's Favorite*. Excellent pictures by him have been bought by American collectors.

**ZAMANG**, n. *za-mǎng'* [native name]: immense tree growing in Venezuela, with a top spreading about a hundred ft. in circumference; *Pithecolobium Saman*.

**ZAMBESI**, *zám-bā'zē*, **RIVER AND REGION**: the most important river on the e. coast of Africa, and fourth in size on the continent; with the extensive region in s.e. Africa, known to mediæval geographers under the general name empire of Monomotapa. This region is shown on old maps as drained by a river called Zambese, or Zambere, on whose banks appear large towns, of which the mythical 'Vigita Magna' was the most famous. The course of the stream, which is the modern Z., is, however, delineated with considerable correctness, and even a small lake is shown in connection with it, not far from the real position of Lake N'gami, whose existence we became aware of only a few years ago, and which is now considered one of the most southern collections of inland waters which communicate with the Z. river and the more eastern lakes. The old maps give also the Nyassa or Maravi, as well as the more northern lakes, Victoria Nyanza and Tanganyika (the latter in connection with the Nile basin), with such degree of accuracy as shows that the distinctive features of the region must have been well known—principally, perhaps, from Arab sources, since there have long been vari-



## ZAMBESI.

ous settlements of that people on the e. and s.e. coast of Africa from the Red Sea to Sofala.

Although the lower region of the Z. river, for at least 300 m. from its mouth, has been in possession nominally of the Portuguese since the beginning of the 16th c., forming the captaincies of Rios di Senna, Tete, and Quilimaue, yet it is only within the last few years, through the indefatigable exertions of Dr. Livingstone (1851-56 and 1858-64), Oswell, Kirk, T. Baines, James Chapman, Charles Andersson, Major Pinto, and other explorers, that we have got any accurate or scientific idea of this vast region,  $8^{\circ}$ — $21^{\circ}$  s. lat. and  $14^{\circ}$ — $37^{\circ}$  e. long; and the total length of what may be considered the main stream (called Leeambye or Liambaji in its upper course), from its mouth to the point shown on Livingstone's map where the Leeba river, which proceeds from Lake Dilolo—on the summit of the water-shed which divides the rivers running n.w. into the Atlantic from those running s.e. into the Indian Ocean—joins it, is about 1,200 m. The Z. drains an area of 600,000 sq. m.

The river-basin of the Z. is coterminous on the n. with a large area of the Congo river system and the great lakes that drain into it; on the s. and w. an obscurely marked water-shed, crossing the Kalihari Desert, separates it from the Orange river basin and the rivers that run through Ovampo Land into the Atlantic; while on the s.e. a well-defined mountain range divides the rivers flowing into the Z. river from those which form the Limpopo river, running into the Indian Ocean.

The name Z. is preserved from the mouth of the river, or rather a short distance above it, to the junction of the main stream with the Chobe, lat.  $17^{\circ} 31'$  s., long.  $25^{\circ} 13'$  e. Thence to its junction with the Leeba (Liba), coming from Lake Dilolo, the Z. river is called Leeambye (Liambai); and at the junction (lat.  $14^{\circ} 10'$  s., long.  $23^{\circ} 35'$  e.) it turns suddenly to the n.e. Part of the basin of the upper Zambesi was explored by Major Serpa Pinto 1878-9. Crossing from the w. several of the head-waters of the Cubango (Andersson's Okavango), formerly thought to connect with the Z., Pinto found that the source of the Cuando (Kwando—Livingstone's Chobe), chief tributary of the Z., is about lat.  $13^{\circ}$  s. and long  $19^{\circ}$  e. He passed several of its upper branches, and descended to the Leeambye by another tributary called Nhengo. The Cuando is a fine large stream, draining a large area of fertile country, and receiving several navigable affluents. Lake Dilolo, from which the Leeba flows, seems to have an outlet both to the n. and to the s. The n. outlet flows probably into one of the tributaries of the Congo.

In the region where the Leeba joins the Leeambye, the main stream is often one-sixth of a m. wide and of considerable depth. From the confluence to the Victoria Falls there are many long navigable tracts. But there are serious obstacles, for hundreds of miles at a stretch, to such navigation as now seems possible on the Congo (Livingstone) above the Yellala Falls.

## ZAMBESI.

This part of central s. Africa may be considered as an extensive plateau or table-land, 3,000–4,000 ft. above sea-level, with an outer fringe or border of basaltic rocks, cutting through which the Z. river forms one of the most striking scenes in the physical geography of the world—the Victoria Falls of Livingstone, or Mosiotunya, or ‘Smoke sounds there,’ of the natives. Here, a few miles e. of where the Chobe joins the Zambesi, the latter—a stream 3,000 ft. wide—plunges down into a chasm formed by an immense crack at right angles to the river’s course, in the hard black basaltic rock which is its bed. The chasm or rift is 360 ft. deep, with almost perpendicular walls and unbroken edges, and about a mile long. The plunge is more than twice the depth of Niagara, and the column of spray which rises is visible for 20 m. The chasm being only about 250 ft. wide, its opposite wall blocks the river’s course until the river reaches an opening in this barrier about three-fifths of a mile from the fall: through this opening the Z. river, reduced to a width of 60 to 90 ft., pours for about 350 ft., and thence is carried along a narrow channel about 30 m. On three sides of this cataract the wooded banks rise 300 to 400 ft.; and tree-covered islands dot the river above. Within 220 m. above the Victoria Falls the river has 72 cataracts and rapids.

The Cubango (the Okavango of Andersson), draining a large district of the Benguela highlands, was supposed to flow into the Z. river; but according to Pinto it passes through Lake N’gami (q.v.), and, emerging as the Botletle, ends in the Makarikari, an enormous basin into which many rivers run and are evaporated. In its lower course the Z. river varies in width from 1,500 ft. to 2 m. and more in the rainy seasons. From the Portuguese town of Tete downward, it is navigable, though with difficulty in the dry season; and it passes through one or two narrow rocky gorges in the Lupata Mountains, which form ugly rapids, except when the river is in full flood. About 80 m. from the mouth it receives from the n. the waters of the Shire, which runs out of Lake Nyassa (q.v.), the Maravi of old geographers, an extensive sheet of water 350 m. long and 60 m. across at its widest part, between lat.  $11^{\circ}$ – $14^{\circ} 30' \text{ s.}$ ; and the Zambesi enters the low country about 50 m. from the ocean, where it divides into many branches, forming a large and very unhealthy delta. The most northern stream is called the Kwaka, or Kilimane, or Quilimane river; and the most southern and deepest channel the Luabo. At Kilimane, or Quilimane (q.v.), about 18 m. from the sea, is the residence of the Portuguese gov. of the region; but there are other entrances long used by slavers and contrabandists, which, till recently at least, have not been accurately laid down in the charts. The difficulty and danger of navigating the entrance of this river have been exaggerated. It is now known that there are four mouths—the Milambe to the w., the Kongone, the Luabo, and the Timbwe—the Kongone being the best, admitting steamers drawing 15 ft.

The Victoria Falls are estimated to be 2,500 ft. above



## ZAMBO—ZAMIA.

sea-level. Tete is considered to be 400 ft.; and the rapids of Lake Nyassa, where the Shire issues from it, 1,552 ft.; while Lake Shirwa, a smaller lake, s.e. of Nyassa, is 2,000 ft. above sea-level.

The natives inhabiting the coast region drained by the Zambesi must be considered of the pure negro type; while the Makololo, who were found in the central and upper country, belonged to the Betjuana family. According to Major Pinto, the latter tribe has now ceased to have a separate existence. In the reign of the third king of a dynasty of conquerors, the Luinas, the former masters of the country, again came into possession, and early in 1878 the remaining Makololos were put to death. On the Upper Zambesi, between the Cuando and Cubango, Major Pinto discovered the Mucassequares, a tribe of Ethiopian origin, of yellowish white color. The Zulu tribe of Amatabele, under Mosilakatze, who inhabit the high region dividing the Limpopo from the Z. basin, have overrun and conquered nearly all the tribes s. of them. The slave-trade is actively carried on in the countries nominally claimed by the Portuguese. Unsuccessful attempts were made a few years ago to plant an episcopate and civilize the natives, through the influence of missionaries.

All the usual tropical productions are found, but owing to the disturbed state of the native tribes, are but little cultivated. The animal kingdom is very similar to that of the adjacent regions of s. Africa; and an immense quantity of ivory is exported both from the w. and the e. coasts. The prevalence of the Tsetse (q.v.) makes travelling difficult in the interior. Extensive coal-fields exist, and gold is found in the neighborhood of Tete and Senna.—See *Travels of Livingstone*; T. Baines's *Explorations*; Andersson's *Oka-vango; To the Victoria Falls of the Zambesi*, by Ed. Mohr (1876); and Major Serpa Pinto's *How I Crossed Africa* (1881).

ZAMBO, n. *zām'bō*, ZAM'BOS, n. plu. *-bōz* [Sp. *zambo*, bandy-legged, a zambo]: the offspring of a negro and a mulatto; sometimes applied to the offspring of an Indian and a negro; also and more usually called SAMBO.

ZAMBONI'S PILE, n. *zām-bō'nīz pīl*: a dry voltaic pile or battery invented, in conjunction with De Luc, by Giuseppe Zamboni, an Italian physician and medical author.

ZAMIA, n. *zā'mī-a* [Gr. *zamia*, hurt, loss—alluding to the sterile appearance of the male fructification]: a genus of plants, nearly related to palms, of nat. order *Cycadaceæ*, of which the species are found in tropical parts of the world. They have a tree-like stem, which in some species is but an underground stub, with a single terminal bud and pinnate leaves. The wood consists of concentric circles, with very loose cellular zones between them. The male and female flowers are on separate plants, in tessellated catkins, whose scales differ in form in the male and female plants. The central part of the stem contains much starch, especially in old plants, and a kind of sago or arrow-root is made from some of them. The central part of the stem of the Breadtree (*Z. cycadis*), of s. Africa, which is 6 or 7 ft. high, with scaly stem, is much used for

## ZAMIOSTROBUS—ZAMORA.

food by the Kafirs and Hottentots, who prepare it by wrapping it in a skin well rubbed with grease, burying it in the ground until it undergoes putrefaction, bruising it between two stones, making it into cakes, and baking it in wood-ashes. The only United States species is *Z. integrifolia* or *pumila*, the coontie, coonty, or coontah of Fla., with short, thick stem, mostly beneath the surface of the ground; it yields what is known as Florida arrow-root; and this and another species are called wild sago in Jamaica. Various species are beautiful hot-house plants in the n. states.—There are numerous fossil species of *Zamia*. Closely allied to it is the fossil genus *Zamites*.

**ZAMIOSTROBUS**, *zā-mī-ōs' trō-būs*: generic name given by Endlicher to several cones from the Secondary and Tertiary strata, because they were supposed to be the fruits of fossil zamias. But Carruthers has shown (*Journal of Botany*, 1867, Jan.) that they belong to true Coniferæ. He has, however, in the same paper, described six species of fruit belonging to zamia-like cycads, to which he has given the generic title of *Cycadeostrobus*: they all are from the Secondary rocks. No cycadean remains whatever have yet been found in newer deposits.

**ZAMITES**, *zā'mīts*: generic name under which are included numerous forms of zamia-like leaves which occur in Mesozoic strata. No certain traces of the trunks have yet been found associated with them, and only one species (*Z. gigas*) is accompanied with fruit, and this is so anomalous that it casts considerable doubt on the determination of the affinities of the foliage.

**ZAMORA**, *thā-mō'rā*: very ancient town of Spain, cap. of the province of Z.; 40 m. n. of Salamanca, 182 m. n.w. of Madrid; on the right bank of the Douro, here crossed by an old stone bridge; 2,000 ft. above sea-level. It is the see of a bishop suffragan of Santiago. Z. was of great importance in the Moorish times, and is said to have been inclosed by seven lines of walls, with a moat between each. It is entered by seven gates, is surrounded by a wall, has a massive square tower with Norman arches, and many interesting remains of mediæval architecture. *La Magdalena*, a church of the Templars, afterward belonging to the order of St. Juan of Jerusalem, is a simple solid edifice of the 12th c., slightly modernized. There are 20 other churches, besides a theological school, barracks, prison, normal and other schools, library, museum, etc. It has manufactures of serges, linens, leather, hats, liqueurs, brandy, and considerable trade in wine and grain. Sir J. Moore (q.v.) urged the Junta of Salamanca to repair the defenses of Z., and receive there his stores, but his retreat had commenced before they had done deliberating. Had Z. been made tenable, Moore would have fallen back on it, instead of on Corunna. The French afterward got possession of it, and though no resistance was made, the town was sacked, neither age nor sex was spared, and the principal persons were put to death. It was again plundered by the French, and has never recovered these visitations.—Pop. 14,000.



## ZAMOSC—ZANE.

**ZAMOSC**, *zâ'môsts*: one of the most strongly fortified towns of Russian Poland, govt. of Lublin; 45 m. s.e. of Lublin, 140 m. s.e. of Warsaw; surrounded by water and a marsh. All the houses are in the Italian style with arcades. There is a large and beautiful castle opposite the former university, a town-hall and arsenal, four churches, monasteries, theatre, etc. There are beer and porter breweries.—Pop. (1880) 8,733.

**ZAMOUSE**, *za-môs'* (*Bos brachyceros*): species of ox or buffalo, found in tropical parts of w. Africa. It is the *Bush Cow* of Sierra Leone; and differs from the buffalo and all other *Bovidæ* in important particulars, especially in the very large size and peculiar fringing of the ears, and in the total lack of dewlap. The forehead also is flatter than that of the buffalo. The color is a pale chestnut and



Zamouse (*Bos brachyceros*).

nearly uniform; the hair is thin, and nearly erect; the ears have 3 rows of long hairs springing from the inside, and a tuft of long hairs at the tip. There is considerable space on the forehead between the horns, which are not long, extend outward and upward, and are suddenly incurved.

**ZAMPOGNA**, n. *tsâm-pŏ'nyâ* [It.]: the Italian bag-pipes; a rough-toned reed instrument shaped like a flageolet.

**ZAND**: see **ZEND**.

**ZANE**, *zân*, **EBENEZER**: founder of the first permanent settlement on the Ohioriver, now Wheeling, W. Va.: 1747, Oct. 7—1811; b. Berkeley co., Va.; of Danish descent. He settled on the Ohio 1770; built a block-house named Fort Henry, where he resisted attacks by Indians, the last one in 1781. He held several appointments, civil and military, and was made colonel. The city of Zanesville, O., founded on land owned by him, was named in his honor. He died in Wheeling.—His sister, **ELIZABETH Z.** (1759–1847), when the fort was attacked by Indians 1777, and the ammunition had become exhausted, insisted that her life was of less importance than that of any man of the garrison, and gained consent to go for a keg of powder in her brother's house, 180 yards distant; she went and returned unharmed, though exposed to volleys from the enemy.

## ZANESVILLE.

ZANESVILLE, *zānz'vil*: city, cap. of Muskingum co., O.; at the junction of the Licking and Muskingum rivers; and on the Baltimore and Ohio, the Cincinnati and Muskingum Valley, the Cleveland and Canton, the Bellaire Zanesville and Cincinnati, the Columbus Shawnee and Hocking, the Zanesville and Ohio River, and the Cleveland Akron and Columbus railroads; 60 m. e. of Columbus, 74 m. n. of Marietta, 168 m. e.n.e. of Cincinnati. It is in an agricultural and bituminous coal region, and with its superior shipping facilities has a large trade. It contains a belt-line connecting the different railroads, electric street railway, 27 churches (Meth. Episc. 8, Bapt. 4, Presb. 3, Rom. Cath. 2, Hebrew 2, Luth. 2, and Congl., Christian, Prot. Episc., Evang. Assoc., Unit. Breth., and Univ., each 1), 25 public schools, public library, gas, electric light, and water plants, 4 nat. banks (cap. \$650,000), 1 state bank, 1 private bank; and 3 daily, 1 semi-weekly, 7 weekly, and 5 monthly periodicals. The manufactures include rolling-mill products, steam-engines, carriages and wagons, cotton and woolen goods, window and bottle glass works, files, laundry soap, flooring and roofing tiles, and building and paving bricks. Z. is on the line of the old 'national road;' was plotted and named Woodbourne 1798; received its present name in honor of Col. Ebenezer Zane (q.v.), a sturdy pioneer in that region, soon afterward; and was the cap. of the state 1810-12. Pop. (1880) 18,113; (1890) 21,009; (1900) 23,543.



## ZANGUEBAR—ZANTE.

ZANGUEBAR': see ZANZIBAR.

ZANGWILL, *záng'wíl*, ISRAEL: English author: 1864—  
 —————; b. London, of poor Jewish parents. Until his ninth year he was educated at Plymouth and Bristol, and was then placed in the Jews' Free School at Spitalfields, where he became head-boy, three times obtaining the scholarships and medals founded to commemorate the admission of Jews into parliament. He became a teacher in that institution, meantime studying for a degree at London Univ., where he graduated B.A. before he was 21 years of age, and afterward took the highest teachers' certificate. In conjunction with a friend he wrote a humorous romance called *The Premier and the Painter*, published 1888. In 1889 he founded *Ariel, or the London Puck*, which was suspended at the end of two years. *The Bachelors' Club* (1891) was instantly successful on both sides of the Atlantic, and enabled Z. to give his time to literature. In 1892 he published *The Children of the Ghetto*, a study of outlawed Jewry. *The King of Schnorrers* (1894) humorously depicted the life of a Sephardim mendicant, and this work, with *Ghetto Tragedies* (1893), ended his Hebrew delineations. Under the head of 'Without Prejudice' he has contributed *causerie* to the *Pall Mall Magazine*, and gossip paragraphs to the *New York Critic* under the head of 'Men, Women, and Books.' He published *The Big Bow Mystery* (1891); *The Old Maids' Club* (1892); *Merely Mary Ann* (1893); and *The Master* (1894).

ZANONIA. n. *za-nō'nī-a* [after James Zanoni, supt. of the Botanical Garden at Bologna, and author of a work on plants]: climbing plants, genus of *Nhandirobæ*. The leaves of *Z. indica*, beaten up with milk and butter, are applied as a liniment in antispasmodic affections. They are also used in baths in nervous diseases.

ZANTE, n. *zăn'tē*: a golden yellow species of sumach from the island of Zante, in the Mediterranean, used for dyeing; called also young fustic, and fustet.

ZANTE, *zăn'tā* (ancient *Zacynthus*): Grecian island, one of the principal Ionian Islands; about 9 m. from the w. coast of the Morea, and 8 s. of Cephalonia; about 24 m. long, 12 broad, 64 m. round; 156 sq. m. The greater part of the island consists of a plain, stretching n. to s., with a breadth of 6 to 8 m., bounded on the w. by a line of hills. The vine is extensively cultivated on the plain, and the wine produced is considered to be of superior quality. Currants, produced from a dwarf species of vine, originally brought from Corinth (whence the name *currant*), are the staple product, the value of the currant crop from Zante (1886) being estimated at about \$2,000,000. There are also nearly 40 different kinds of vine, and 10 of olive—including the *karudolia*, yielding the best edible olive-berry. Pomegranates, olives, melons, peaches, and citrons also are grown.—Z. is said to have been colonized by Achæans from the Peloponnesus; and is mentioned in Homer with the epithet 'woody,' which, however, is not apt at the present day, though it is justly called, in an Italian proverb, 'the flower

## ZANTE—ZANZIBAR.

of the Levant.' It is subject to frequent earthquakes, which seem likely to recur about once in 20 years. The most notable mineral feature of Z. is its pitch-wells, described by Herodotus, about 12 m. s. of the town of Z., in a marshy district. Pop. (1879) 44,522; (1889) 44,070; (1900) 45,032.

**ZAN'TE:** city, capital of the island of Z., and the largest town in the Ionian Islands; at the head of a small bay or harbor on the e. coast of the island; on the site of the ancient town, of which the only remains are a few columns and inscriptions. The houses stretch along the semicircular outline of the bay a mile and a half and extend up the slope of the castle-hill. Most of the streets are narrow, but clean, and the older houses are in the picturesque Venetian style: the huge lattices of wooden framework, resembling those employed in Eastern harems, with which the windows were formerly fitted, are being rapidly discarded. The principal street is broad and handsome, the churches are numerous, and the market-place spacious. The harbor has been greatly improved of late years; it is now protected by a long mole, and has a light-house; but is still somewhat exposed and insecure. A magnificent and extensive view is obtained from the citadel in the highest part of the town. Z. is the see of a Greek protopapas and of a Rom. Cath. bishop.—Pop. (1896) 14,650.

**ZANTIOTE**, n. *zăn'tî-ôt*, or **ZANTIOT**, n. *zăn'tî-ôt*: a native of Zante, one of the Ionian Islands.

**ZANY**, n. *zăn'nî* [O.It. *zane*: It. *zanni*, familiar forms of *Giovanni*, or *John*, hence a silly-John, a clown]: clown in a play; a merry-Andrew: V. to imitate; to play the buffoon. **ZA'NYISM**, n. *-nî-izm*, the state or conduct of a zany.

**ZANZIBAR**, *zân-zî-bâr'*, or **ZANGUEBAR**, *zâng-gâ-bâr'*: sultanate in e. central Africa; defined (1887) according to recent conventions of European powers as comprising the four islands—Zanzibar, 640 sq. m., Pemba, 380, Mafia, 200, Lamu, 50—off the e. coast, with the Zanzibar coastlands (6,000 sq. m.) and the stations on Somal coast (150 sq. m.); total 7,420 sq. m. (In 1888 Pemba appears to have been ceded to the Brit. E. African Co.; and Kisimayu station, on the Somal coast, was claimed by Italy.) The territories of the sultan of Z. comprised formerly all that part of the e. coast of Africa between Magdashooa, 2° n., and Cape Delgado, 10° 42' s. lat.; bounded n. by the independent tribes of Somal and Gallas, s. by the Portuguese province of Mozambique. The extent of the coast was about 1,100 m. Parallel to the coast are numerous islands, the most important of which are Zanzibar, containing the cap. of the same name, Pemba, and Mafia (Monfia on the charts). The territories on the mainland had no defined limit toward the interior, being occupied by heathen tribes, over whom the sultan's authority was hardly even nominal beyond the sea-board.—The soil along the coast is fertile in rice, millet, peas, beans, melons, pumpkins, the sugar-cane, cocoa-nut, banana, plantain, etc.; and the forests sup-



ply the caoutchouc-tree and many valuable species of timber. Cattle, sheep, and fowls are plentiful, and tropical wild animals abound. Rice, sugar, molasses, ivory, gums, gold, and cowries are exported. The heat on the coast is excessive, and the climate very unfavorable to Europeans. The name Z. is applied to the coast from  $3^{\circ}$  n. to  $10^{\circ}$  s.

The island of Z., by far the richest and most important part of the sultan's dominions, is about 20 m. from the African coast; is about 48 m. in length, and 15 to 30 in breadth; about 400,000 acres; and the soil is in most parts of exceeding fertility: being covered with woods and plantations, and the frequent rains causing perpetual verdure, it everywhere presents a delightful appearance. It is very flat, the highest point in the s. being not more than 450 ft., composed mostly of coral, and abundantly watered by rivulets, which flow at all seasons of the year. Along the n.w. coast a chain of hills rises a little above 1,000 ft. The principal products are cocoa-nuts, cloves, rice, sugarcane, manioc, millet, and fruits in utmost abundance, especially oranges of finest quality, which can be purchased at the rate of 1,000 for a dollar. The island is intersected by paths and green lanes in every direction, affording a never-ending variety of pleasant walks and rides. The country-houses of the Arab proprietors, and the huts of their slaves are thickly dotted over the surface, surrounded with gardens and fields. The hedge-rows are covered with flowering creepers, and pineapples grow among them in wild profusion. In many parts are glades of undulating grassland, of park-like appearance, dotted with gigantic mango-trees; the ponds are covered with rushes and water-lilies; and the air is perfumed with the blossoms of the orange and clove.—The pop. of the island was estimated (1887) about 220,000.

For the island of Pemba, see that title.

The Z. coast-land (now called usually the Swahili coast) is a swampy and alluvial region, of wonderful fertility, adapted for raising all tropical products.—Pop. (1887) estimated about 500,000; of sultanate, estimated 765,000.

The earliest settlement of Arabs on the e. coast of Africa occurred about A.D. 924; and for several centuries flourishing republics, governed by elders elected by the citizens, existed along the coast. Vasco da Gama visited Z. 1499; and 1503 the dominion of Portugal was recognized by the inhabitants, who agreed to pay an annual tribute; but the Portuguese never held it for very long periods. About 1735 they were finally expelled, and 1784 the island was taken by the imaum of Muscat, in whose family the govt. remained until the death of Seyed Saeed bin Sultan, 1854, when the Arabian possessions fell to his son, Seyed Thoweni, and Z. and its dependencies to Seyed Majid (d. 1870), who was succeeded by his younger bro., Seyed Barghash, who entered into treaties with Great Britain for suppression of the slave-trade, and who visited England 1875. He died 1888; and his son and successor, Seyed Khalif, inherited a mere fragment of the former powerful Moham-medan empire on the e. African coast.

## ZANZIBAR.

In 1896 Seyed Khalif, immediately on the death of Hamid bin Thwain, who had succeeded to the sultanship, with 700 Askaris seized the palace and proclaimed himself sultan. He had made a similar attempt in 1893, but in 15 minutes was ousted by the British authorities. As Z. is under Brit. protection, on the occasion of Seyed Khalif's attempt in 1896 the Brit. consul procured the landing of an armed force from the ships of war in the harbor. The usurper having refused to submit to an ultimatum from the consul, the palace was bombarded, Aug. 27, and in a short time destroyed. Seyed Khalif took refuge in the German consulate. Demand was then made by the British consul for his surrender, but the German consul refused to comply except on the order of his home government. At first a disposition was shown at Berlin to give up the fugitive on condition that the British authorities should guarantee to him the treatment due to a prince and a prisoner of war; but eventually he was taken on board a German warship and transferred to the nearest German station. The general opinion at Zanzibar, according to the *London Times*, was that the time was opportune 'for hoisting the British flag, once for all abolishing Arab rule and proclaiming the abolition of slavery;' but on Aug. 30, after a protracted conference with the German minister of foreign affairs, Emperor William decided not to assent to Great Britain's conversion of the protectorate of Zanzibar into the condition of a crown colony. Hamond bin Mahomed, a cousin of the late sultan and said to be a very enlightened man, was proclaimed successor to the sultanate Aug. 26. He was, of course, the nominee of the British govt.

ZANZIBAR', or ZANGUEBAR': city, cap. of the island and sultanate of Z.; largest city on the African sea-board next to Alexandria and Tunis; on the w. side of the island. It is extensive, and from the sea is imposing in aspect; but its interior is mostly a mass of hovels, with a labyrinth of narrow dirty lanes. Nevertheless it is an important place, the centre of trade, missionary work, and exploration for the whole e. portion of the continent. The houses of the principal inhabitants and of the European residents are large flat-roofed buildings, generally with an interior courtyard; and some of them, and especially the palace of the sultan, may almost claim to be magnificent. During the season of the n.e. monsoon, Z. is visited by probably 30,000 to 40,000 strangers from Arabia, India, and n. Africa. Several lines of ocean steamers call at Z. The chief people are the Arab landed proprietors, who form a sort of aristocracy, possessing large plantations and numerous slaves; besides these there are slaves, free blacks, natives of the Comoro Islands and Madagascar, and 5,000 to 6,000 natives of India, who keep nearly all the shops in the town, and through whose hands nearly all the foreign trade passes. The languages of the court and of the Arab pop. is Arabic; while the slaves and the free black population speak a dialect called *Kisawahéli*, one of the great family of s. African languages.—The climate is extremely equable and salubrious, the thermometer having probably never



## ZAPTIEH—ZARAIK.

risen as high as 90°, nor fallen lower than 70°. Nearly 200 inches of rain fall during the year, of which half at least falls in Mar., Apr., and May.

The trade is very considerable: imports consist of cotton goods, brass wire, beads, arms, etc.; exports, gum copal, cloves, ivory, cocoa-nut oil, sesame, dye-stuffs, and a great variety of other articles.

Pop. of city estimated (1887) 100,000, of all kinds and races.

**ZAPTIEH**, n. *zǎp'tî-â* [Turk]: a Turkish policeman.

**ZARA**, *zâ'râ* (ancient *Jadera*): Austrian seaport, chief town of Dalmatia; on the coast of the Adriatic; 73 m. n.w. of Spalatro, about 128 s.e. of Trieste. Till 1873 Z. was strongly fortified. It is built in the form of an oval, on a narrow promontory, separated from the mainland by a moat, across which is a drawbridge. The town is entered by two gates, one from the sea, called Porta-Marina, supposed to be partly of Roman construction; and one from the landward side, called Porta-di-Terra-Firma. The ramparts, of Venetian construction, and partly planted, afford a fine promenade. There is a spacious and well-protected though shallow harbor. The streets generally are narrow and ill paved, and the drainage defective; the town is not well supplied with water. Of its churches, the most noteworthy are its cathedral, founded by Henry Dandolo, Doge of Venice, and the church of the patron saint, St. Simeon. There are many convents and monasteries; a lyceum, gymnasium, and other schools; a barrack, and a naval and military arsenal; hospitals, a theatre, museum, and other public buildings. There is a lofty marble column, which is all that is left standing of an ancient Roman temple: there are also remains of a Roman aqueduct. Z., which was the ancient cap. of Liburnia, in Illyricum, is the seat of the govt. of Dalmatia, and the see of a Rom. Cath. abp. The commerce is unimportant. The inhabitants are Italian by descent and in their language. Many of them are engaged in fishing and in the coasting trade. The chief manufactures are rosoglio, maraschino, leather, silk, and linen fabrics.—Pop. (1890) 11,496.

**ZARAFSHAN'**: see BOKHARA.

**ZARAGO'ZA**: see SARAGOSSA.

**ZARAIK**, *zâ-rîsk'*: Russian town, govt. of Riazan; 32 m. n.w. of the town of Riazan, 80 m. s.e. of Moscow; a few miles from the right bank of the Oka, tributary of the Volga. The town was founded in the 13th c.; and 1531 Ivan the Terrible erected on the site of the old fortifications a strong fortress, which thrice resisted the assaults of the Tartars, and which still stands. Another noteworthy object is the Cathedral of St. Nicolas, which dates from 1631. There are manufactures of soap and candles, also several tanneries and breweries; these, however, produce only a supply for the inhabitants. The commerce of the town has greatly declined since 1847, when the new road of Riazan was opened, leaving Z. out of the way.—Pop. 5,050.

## ZARATHUSTRA—ZAX.

ZARATHUS'TRA: see ZOROASTER.

ZARATITE, n. *zâr'ă-tīt*: a mineral, a hydrous carbonate of nickel, also called emerald nickel.

ZAREBA, *za-rē'ba*, or ZEREBA, *zā-rē'ba*: an inclosure or fenced camp for protection against wild animals and other enemies, especially during the night: used in the Soudan and other parts of Africa.

ZAUSCHNERIA, *zaw shnē'rī-a*: beautiful plant of the Evening Primrose family (*Onagraceæ*), of wh'ch only one species is known, *Z. Californica*. It grows  $\frac{1}{2}$  ft. high, with downy stems and leaves, and bright scarlet flowers, 2 in. long, with projecting style and stamens, resembling fuchsias. The flowers grow from the axils of the upper leaves, and the calyx as well as the corolla is highly colored. It is a perennial, blooming in the latter part of the season, and needs protection in winter n. of New York. It was named from Zauschner, Bohemian botanist.

ZAX, n. *zāks* [AS. *seax*; Icel. *sax*, a knife or short sword; OHG. *saks*]: a slater's hatchet, with a sharp point on the pole, for perforating the slate to receive the pin. It is about 16 in. long and 2 in. width; it is somewhat bent at one end, and the spur is three inches long.



## ZAYAT--ZEBID.

**ZAYAT**, n. *zâ'yăt* [native name]: in Burmah a public shed or portico for the accommodation of travellers, loungers, and worshippers, found in every Burmese village, and attached to many pagodas.

**Z-CRANK**, n. *zē'krängk* [from its zigzag form]: in *mach.*, a peculiarly shaped crank in the cylinder of some marine steam-engines.

**ZEÄ**, *zē'ä* (ancient *Ceos*): island of the Grecian Archipelago, one of the Cyclades; 13 m. e. of Cape Colonna; 14 m. in length, 8 in greatest breadth. It is somewhat egg-shaped. Its surface rises from the coast in terraces, culminating in the centre in Mt. St. Elias, lat. 37° 37' n., long. 24° 21' e. The climate is healthful, and the soil fertile. The products are wine, fruit, barley, cotton, and silk. Attention is given to rearing of cattle and silk-worms. Pliny says that Z. was formerly united to Eubœa, but that four-fifths of it were carried away by the sea. Z. was the birthplace of the lyric poets Simonides and Bacchylides. The island once possessed four towns, but there is now only one, *Zea*, on the n.w. slope of the hill, about 3 m. from the coast, on the site of the ancient *Iulis*, of which the most important remains are a colossal lion, about 20 ft. in length, lying a short distance e. of the town. A few remains also are still seen on the sites of the other three ancient towns. The harbor of Z., Port St. Nicholas, about 3 m. from the town, admits the largest vessels, and is well frequented.—Pop. of island 4,300.

**ZE'A**: see MAIZE.

**ZEAL**, n. *zēl* [F. *zèle*—from L. *zēlus*; Gr. *zēlos*, emulation, jealousy—from *zeein*, to boil, to seethe: It. *zelo*]: great ardor in the pursuit or support of anything; enthusiasm; fervor. **ZEALOT**, n. *zēl'üt* [Gr. *zēlôtēs*]: one who engages warmly and earnestly in any cause; one carried away by excess of zeal; a fanatic. **ZEALOTS**, n. plu. *zēl'ütz*, a Jewish fanatical sect, who carried on a desperate struggle with the Romans which resulted in the fall and total destruction of Jerusalem, A.D. 70. They were also called the *Sicarii* or *Assassins* on account of their excesses in behalf of the Mosaic law. **ZEAL'OTRY**, n. *-üt-rī*, excessive enthusiasm; fanaticism. **ZEAL'OUS**, a. *-üs*, warmly engaged in any pursuit or cause; very earnest; enthusiastic. **ZEAL'OUSLY**, ad. *-lī*. **ZEAL'OUSNESS**, n. *-nēs*, the state or quality of being zealous.

**ZEÄLAND** (island of Denmark): see SEELAND.

**ZEÄLAND** (province of the Netherlands): see ZEE-LAND.

**ZEBEC**, or **ZEBECK**, n. *zē'bēk*: same as XEBEC (q.v.).

**ZEBID**, *zē-bēd'*: town of Arabia, dist. of Yemen; on the river Zebid, 15 m. from its mouth; 115 m. s.w. of Sanaa, 60 m. n. of Mocha. The town is of great antiquity, on account of which, and of the dark color of the bricks of which it is built, it has a gloomy appearance. It is strongly fortified, with high walls said to be a league in circuit, flanked with numerous towers. It possesses a large

## ZEBRA.

mosque, with an elegant octagonal tower. Z. was formerly a place of commercial importance, but it has declined into insignificance, owing to the accumulation of sand in the mouth of the river.—Pop. 7,000.

**ZEBRA**, n. *zē'bra* [a native name]: a wild animal of Africa, somewhat resembling an ass, but larger, and beautifully striped. **ZE'BRINE**, a. *-brīn*, of or pert. to the zebra. **ZEBRA-WOOD**, the wood of a tree of Brazil and Rio Janeiro, of an orange and dark-brown color, variously mixed; the wood of the *Omphalōbium Lambertii*, ord. *Connaracēæ*.—The name *Zebra* is given sometimes to all the striped *Equidæ*, natives of s. Africa, including the *Dauw* (q.v.) and *Quagga* (q.v.); but in a more restricted use it designates a single species, *Equus* or *Asinus Zebra*. In the whole group the characters more resemble those of the ass than of the horse; the tail is furnished with long hairs only toward the tip, and the hind-legs are without warts; the neck is full and arched, the mane stands erect. The Z. is about 12 hands high at the shoulder. It is of light and graceful form, with slender limbs and narrow hoofs; head light, ears rather long and open; ground color white, or slightly tinged with yellow; head, neck, body, and legs striped with black—neck and body transversely but not regularly; head with bands in various directions, legs with irregular cross stripes. The Z. lives in small herds, inhabiting the most secluded spots. Its senses of sight, smell, and hearing are very acute, and the least alarm is sufficient to make a whole herd scamper off, with pricked ears and whisking tails, to inaccessible retreats among the mount-



*Zebra (Asinus Zebra).*

ains. When attacked, however, and compelled to defend themselves, zebras do it vigorously, the herd forming in a compact body, with their heads toward the centre, and their heels toward the enemy, repelling even the lion and leopard by their kicks. The Z. has been domesticated, and used as a beast of burden, but generally shows a vicious and untractable disposition. The flesh is eaten by the natives and hunters of s. Africa. A hybrid has been produced between the Z. and the ass.



## ZEBU.

ZEBU: one of the Philippine Islands, between Luzon and Mindanao; prior to 1898 a Spanish possession, but after the war with Spain was ceded to the United States, with other islands, as territorial indemnity for the expense of the war; 139 m. n.n.e. to s.s.w., and 24 m. e. to w.; area of mainland 1,688 sq. m., of dependent islands, 114 sq. m.—total 1,782 sq. m. A mountain chain called the Cordillera Central runs from n. e. to s. w. throughout the island. The rivers are of little importance, the longest being the Batiguaguan or Balamban. The manufacture of sugar, salt (especially on the island of Mactan at Opon), cocoanut, wine, pottery, fabrics of silk, sinamay, hemp, pina cloth. and cotton, also sugar sacks, is extensive. The fisheries are also important, and the inter-island and foreign commerce through the port of Zebu is very large. Hemp was exported from the island in 1899 to the value of \$3,151,910; sugar, \$770,503; and copra, \$241,953. The scarcity of rain retards agricultural development. The chief products are rice, chocolate, corn, sugar, cotton, tobacco, coffee, and vegetables. There are also valuable and extensive coal beds, gold and silver-bearing lead ore, and petroleum is found with coal in Toledo. Pop. (1899) 504,076.

The town of Zebu, on the e. coast of the island, about 360 m. from Manila, is the capital of the province of Zebu, and the oldest provincial town in the archipelago. The streets are wide and are laid out on a regular plan. The town has a cathedral and other churches.

ZEBU, *zēbū*, or INDIAN Ox, or BRAHMIN Ox: the E. Indian bull or cow, very nearly allied to the common ox, of which naturalists generally regard it as a mere variety, though some think it a distinct species (*Bos Indicus*). The most conspicuous distinctive character is a large fatty hump on the back, above the shoulders; also the legs are rather more slender and delicate than in the European ox. The hump attains very great size in animals plentifully supplied with food and not compelled to work; in those which are ill fed or hard worked it is comparatively small. It is alleged that intermixture takes place freely with the common ox, and that there is no difference of anatomical structure; but these statements require verification. Vasey found the number of caudal vertebræ in the Z. to be only 18, while in the common ox it is 21; also the period of gestation in the Z. is said to be 300 days, while in the common ox it is 270. The Z. is diffused over India, China, the Asiatic islands, Madagascar, and the e. coast of Africa. There are many breeds, differing much in size; the largest being larger than any oxen of Europe, while the smallest are not much larger than a large mastiff. The hump of the largest breeds is said to be sometimes 50 lbs. in weight. European residents in India esteem the hump delicious for the table. There are hornless breeds; but most of the breeds have short horns. There is a breed with two fatty humps, one immediately behind the other, which is common in the vicinity of Surat. The voice of the Z. resembles the grunting of the yak almost as much as it resembles the lowing of the ox. The Z. is used in

## ZEBULUN—ZECHARIAH.

India both as a beast of draught and of burden, and is used occasionally for riding, being able to travel 20 to 30 m. a day. It is very gentle and docile.

The Brahminy or sacred bulls of the Hindus, consecrated to Siva, are of this kind of ox. They are caressed and pampered by the people, and to feed them is deemed a meritorious act of religion. The Brahminy bull may go where he pleases; it is not lawful to beat him, even if he be eating a valuable crop, or if he enter a shop and devour the articles exposed for sale. He soon learns to despise shouting, which is the ordinary expedient to drive him away, and makes himself at home everywhere.

**ZEBULUN**, *zēb'ū-lūn*: one of the 12 tribes of Israel, descendants of the 6th son of Jacob by Leah. The blessing of Jacob was that Z. should dwell at the haven of the sea; and that of Moses was that Z. should suck of the abundance of the seas. In the Exodus from Egypt the tribe marched third in the order; at Sinai it numbered 57,400 men; on the plains of Moab 60,500. Its allotment in Canaan was w. of the Sea of Galilee, and included Nazareth and Cana. The tribe of Z. is mentioned with honor. Deborah directed Z. and Naphtali to be summoned against the enemy, Sisera; and in her song of triumph she said, 'Out of Z. came they that handle the pen of the writer' Gideon also called the tribe and two others to be victors. Z. furnished one of the Judges, Elon. To Hezekiah's call for religious reform, Z. responded humbly and readily. And on this tribe and Naphtali first shone the 'great light' of prophecy, the Christ.

**ZECHARIAH**, *zēk-a-rī'a*: eleventh of the minor prophets of Israel; called in the book of prophecy which goes under his name 'the son of Berechiah, the son of Iddo,' but in Ezra, 'the son of Iddo': b. in Babylonia, during the captivity. He accompanied the first band of exiles, more than 40,000 men with their households (according to the decree of Darius, B.C. 536), on their return to Palestine under Zerubbabel and Joshua. He appeared as a prophet in Jerusalem at the same time with Haggai (q.v.), in the 2d year of Darius Hystaspes (B.C. 520). Very little is known of his personal history, but evidently he was a man of influence and a leader among his countrymen. He combined in himself (if brought up as son and successor of Iddo) the office of priest with that of prophet. Ezra expressly ascribes to Haggai and Z. the merit of stirring up, by their prophetic inspiration, the patriotic enthusiasm of the Jews to complete the rebuilding of the Temple. Later traditions, probably more or less in the line of historic fact, state that he assisted in providing for the service of the Temple (various of the liturgical psalms being ascribed to Z. and Haggai), and that he was a member of the Great Synagogue (see **SYNAGOGUE, THE GREAT**).

The prophecies of Z. may be divided into three parts: the first (chapters i.-viii.) consist mainly of a series of visions relating to the building of the Temple, the glory of the city, the removal of all abominations out of the land, etc., and ends with a prediction that Jerusalem will be-



## ZECHIN—ZEDEKIAH.

come, as it were, a centre of religious worship to all the world. The second (ix.-xi.) threatens Damascus and Phœnicia and the cities of the Philistines with ruin; predicts that Judah will be greater than Javan (Greece), that Israel and Judah will be reunited—though almost immediately he symbolically shows the impossibility of this—and that both Assyria and Egypt will be humbled. The third part sets forth that dark times for Judah are drawing nigh, which shall be as an ordeal for the nation. After sore trial it shall come forth thoroughly purged from iniquity, and then the Lord will appear in his glory on Mount Olivet, fight victoriously against the hosts of heathendom, and compel all who are not destroyed by his wrath to worship him at Jerusalem. A millennium of holiness will then begin: ‘In that day shall there be upon the bells of the horses, “Holiness unto the Lord;” . . . yea, every pot in Jerusalem and in Judah shall be holiness unto the Lord of hosts’ (xiv. 20, 21).

Numerous biblical critics, in Germany and England, judging from the internal evidence, consider the first part only (i.-viii.) to be the work of Z. There is indeed a unity, consistency, and sequence in the visionary predictions, and a harmony both of style and matter—the imagery bearing very distinctly the impress of those two master-spirits of the exile, Ezekiel and Daniel—that no candid critic can overlook; while the remaining chapters (ix.-xiv.) seem unconnected in subject with what precede; and speak of idols and false prophets in terms not literally applicable to the times subsequent to the return from the captivity. The style also is softer, richer, more poetical: the spirit of Ezekiel is exchanged for that of Jeremiah or for the latter portion of Isaiah. The critics however are not agreed whether these chapters of the second part are the work of one or two authors. On the whole, while the argument for more than one author is not without some force and more plausibility, the evidence has not, to the majority of students, been sufficient to compel a departure from the traditionary view of a single author.

**ZECHIN**, n. *zěk'ín* [It. *zecchino*, a sequin (see **SEQUIN**)]: an Italian gold coin—generally **SEQUIN**. **ZECCHINO** (see **DUCAT**).

**ZECHSTEIN**, *zěk'stîn* [Ger. ‘mine-stone’]: deposit of calcareous rock which covers the Kupfer-schiefer, and which received this name because it must be cut through before reaching the mineral-bearing beds beneath. It is the equivalent in Thuringia of the fossiliferous limestones of Permian age of n. England.

**ZED**, n. *zěd*: the common name in the British islands of the letter Z.

**ZEDEKIAH**, *zěd-ě-kī'a*, originally **MATTANIAH**, *măt-ta-nī'a*, last King of Judah: reigned B.C. 597–586; d. prob. in Babylon; son of the ‘good Josiah’ by his wife Hamutal. Z. succeeded his nephew Jehoiachin, who had rebelled against his master, Nebuchadnezzar, King of Babylon, and was besieged in Jerusalem, and taken prisoner, after a

## ZEDOARY—ZEELAND.

brief reign of three months. Nebuchadnezzar bestowed the vacant throne on Z., doubtless in the expectation of securing a faithful liegeman. But Z. was a weak, unwise ruler, probably incapable of political fidelity: in the phraseology of the Jewish historian, 'he did that which was evil in the sight of the Lord.' Forgetting his obligations to the Babylonian monarch, he lent a ready ear to the boastful words of the nobles and princes of Judah, and, in spite of the earnest and reiterated remonstrances and warnings of the prophet Jeremiah, finally consummated his perfidy by forming an alliance with Egypt, the hereditary enemy of Assyria and Chaldæa. Swift destruction overtook him. A Babylonian army invaded and ravaged the country, besieged Jerusalem, and after inflicting a crushing defeat on an Egyptian force that was marching to the relief of the city, reduced the inhabitants to such horrible extremities that they could no longer hold out. Z., accompanied by his wives and children, fled in the darkness of night toward the Jordan, but was overtaken and made prisoner near Jericho. The monarch and his sons were sent to Riblah, at the n. end of the valley of Lebanon, where Nebuchadnezzar then abode. The conqueror, with the usual Asiatic cruelty, ordered the sons to be slain before their father's face, and then deprived the wretched parent of his eyesight. Thus maimed, and bound with fetters of brass, he was conveyed to Babylon, where, the tradition relates, he ground in a mill until he died. The temple and city were destroyed, the inhabitants carried off into captivity, and the kingdom of David and Solomon ceased to have a place on the earth.

**ZEDOARY**, n. *zěd'ō-ā'rĭ* [Port. *zedoaria*; Pers. *jadwār*]: the root of a plant resembling ginger, but of a sweet scent, used as a stimulant; the product of certain species of *Curcuma* (see **TURMERIC**), natives of the E. Indies. The **ROUND Z.** of the shops is the product of *Curcuma zedoaria*, native of both India and China; having palmate root-stocks, straw-colored within. **LONG Z.** is produced by *C. zerumbet*, native of various parts of the E. Indies; having long palmate root-stocks, yellow within. Z. is a powerful sudorific.

**ZEEKOE**, n. *zā'kō* [D., sea or lake cow]: name given by the Dutch colonists of s. Africa to the hippopotamus.

**ZEELAND**, *zē'land*, Dut. *zā'lānt*, or **SEE'LAND**: province of the Netherlands, consisting mainly of the islands Walcheren, N. Beveland, S. Beveland, Schouwen, Duiveland, Tholen, St. Philipsland, and Wolfaartsdyk; 51° 20'—51° 45' n. lat., 3° 21'—4° 15' 54" e. long.; 689 sq. m. The boundaries are: S. Holland on the n., the Easter Scheldt on the e., Belgium on the s., and the North Sea on the w. Nearly three-fourths of the people are Protestants, having 138 churches; the remainder, except 670 Jews, with 4 synagogues, are Rom. Catholics, who have 36 places of worship. The provincial cap. is Middelburg (16,000). Other important towns are Flushing (12,000), Goes (pron. *hūs*), in S. Beveland; and Zierikzee, in Schouwen. The greatest



## ZEILIN—ZEIN.

part of the soil, which is a rich clay, has been redeemed from the sea; and almost in the centre of Walcheren, S. Beveland, and Schouwen, there are seen still the high mounds of earth called 'hills of refuge,' which the early inhabitants formed as places of safety for themselves and cattle when a high tide burst over the newly acquired lands. The number of Polders (q.v.), or drained districts, in the province amounts to about 400. Z. is almost entirely arable, and produces the finest crops of wheat, barley, oats, rye, peas, beans, colza, beet, flax, hemp, canary-seed, man-golds, etc. Potatoes are extensively planted; and madder for the manufacture of dyeing material forms a valuable agricultural product. Horses, horned cattle, sheep, swine, and goats are the stock. In many districts of Z., extensive orchards beautify the farms.

The neighboring seas abound with fish, and in Schouwen many eggs are collected, myriads of water-fowls resorting thither to make their nests. The principal industries, apart from agriculture, are preparing of madder for the market, weaving calicos, rope-spinning, ship-building, beer-brewing, soap-boiling, making vinegar, salt, starch, tobacco, tile and brick, tanning leather, grinding corn, sawing wood, etc. The people of Z. are kind and hospitable; and in the country parishes are much attached to their fairs, meetings for merry-making, and other old customs, which might with advantage be given up. Few marriages take place among the agricultural portion of the population till absolutely necessary, yet cases of desertion are rare, as they would utterly disgrace the young man concerned.

A fine ship-canal through the island of S. Beveland was opened 1866, taking the place of the Easter Scheldt. A railway from Flushing, through Walcheren and S. Beveland, communicates with the main Belgian lines at Roozendaal, and by Breda leads to Rotterdam, Amsterdam, or Germany. Pop. (1880) 188,614; (1900) 219,832.

**ZEILIN**, *tsī'lin*, JACOB: commander of marines: 1806, July 16—1880, Nov. 18; b. Philadelphia. He was commissioned lieut. of marines 1831; had active part in the defense of Monterey, Cal., 1846, and the conquest of that country; was brevetted major for gallantry in the action of San Gabriel river 1847; participated in the taking of Los Angeles and the battle of La Mesa; was in command of San Diego; and took part in the operations in that vicinity and at Mazatlan. Promoted to captaincy, he was on duty in the east; was fleet marine-officer in the Com. Perry expedition to Japan; served at Norfolk, Va., 1854-57; was present and wounded in the first battle of Bull Run; commanded at the New York barracks 1862-3; co-operated at Charleston with the blockading ships 1863; was commandant at Portsmouth, N. H., 1864; and, commissioned col. 1864, and brig.gen. 1867, of the marine corps, was thereafter at Washington, where he died, having retired from service 1876.

**ZEIN**, n. *zē'in* [Gr. *zeia*, a species of grain]: the gluten of maize, a substance of a yellowish color.

## ZEISBERGER—ZEITUN.

**ZEISBERGER**, *zīs'berg-ér*, Ger. *tsīs'bërĥ-ér*, **DAVID**: early Moravian missionary to the N. Amer. Indians: 1721, Apr. 11—1808, Nov. 17; b. Zauchtenthal, Moravia. Coming to this country 1740, he studied in the Indian school at Bethlehem, Penn., and among the Indian tribes, becoming acquainted with five languages, the Delaware, Onondaga, Mohican, Chippewa, and the Mousay-Delaware. No Indian missionary ever had greater success and influence. He labored at Shamokin and Onondaga 1745–52, until the breaking out of the French war. After this he was among the Connecticut and Moravian Indians; founded a mission on the Allegheny river 1767, on the Beaver (Friedenstadt) 1770, and on the Muskingum, O., 1772. All together, he established 13 truly Christian towns of Indians. He prevented the Delawares from joining the British Indian forces in the revolution. He followed the Delawares to Canada, and 1798 founded Goshen, O., where congress granted the Moravian Indians a tract of land. There he died. He published a spelling-book and hymns for the Delawares: and lately his *MSS. Dictionary in German and Delaware*, and *Essay toward an Onondaga Grammar*, have been printed (1887–8). He also left in MS. a *German and Onondaga Lexicon*, a *Delaware Indian Grammar*, and hymns and sermons. See *Life* by Bishop Sweinitz (1870), and *Diary of David Zeisberger* (1888).

**ZEITGEIST**, n. *tsīt'gīst* [Ger.]: the spirit of the time.

**ZEITUN**, *zī-tūn'*: town and dist. in the highlands of Cilicia, Asia Minor; 37°—38° n. lat., 34°—35° e. long.; inhabited by a community of Armenian Christians, claiming independence of the Turkish govt., and forming virtually an Asiatic republic. Z. is in the upper basin of the Jyhun or Pyramus, where that river crosses the Taurus Mts. in descending from the table-land of Asia Minor to the low plain of Cilicia which surrounds the n.e. corner of the Mediterranean Sea. It is surrounded on all sides by inaccessible crags, except on the e., where it is bounded by the deep channel of the Pyramus. The hills are covered with magnificent pines, plane-trees, and evergreen oaks. Springs and brooks, never dried up during the summer, irrigate the meadows; but the *soil*, though abounding in patches of great fertility, does not produce grain sufficient for the inhabitants. The mulberry-trees give occupation to the women in feeding silk-worms. The men are engaged chiefly in smelting and manufacturing the iron supplied by the mountains into plowshares, horse-shoes, nails, etc., which they exchange for grain and other articles at Marash and Kaisariyeh. The language of Z. is a rude dialect of Armenian, in which the only literature consists of popular songs not committed to writing. Education is much neglected; and children, except when intended for the priesthood, are not sent to school after the age of 10 or 12. The inhabitants, like the kindred race in Armenia, are free from Asiatic vices. They resemble Europeans in their respect for women. Crime is not frequent; there are no prisons, and it is asserted—perhaps with some exaggeration—that murder has never been committed in the country for



gain. The Zeitunlis have, however, shown great jealousy of foreigners; and until 1854, when their country was visited by Léon Paul, a French Prot. clergyman, they were known in Europe only from the statements of Armenian priests, and from articles in the Armenian newspapers of Constantinople. Even now, information about them is scanty. The government seems to be patriarchal, vested in elders of the people, with some prerogatives in the priesthood. When a grievance is felt, complaint is made to the priests, who meet in council and refer the complaint to the elders assembled as a senate: they decide on the course to be taken. All offices are conferred by popular election, the executive power being placed in the hands of four princes. There are 20 villages in the district, and the chief town, Z., is said to contain 20,000 inhabitants. The Zeitunlis can muster an army of 7,000 to 8,000 men to defend the mountains against the Turkish pashas; and they are in alliance with a neighboring Turcoman chief, also independent of the Turks, who brings 10,000 men into the field.

Z. is a relic of Armenian Cilicia, where, till 1393, the kingdom of Armenia thrived. At that date it fell under the yoke of the Seldjoncides. The last of the house of Armenian kings, that of Roubinian, reigned in Cilicia for four centuries, establishing there their throne after the devastation of Great Armenia by Tartars and Persians, and while Lesser Armenia was in the hands of the Greeks. Since that period, the native populations have been gradually assimilating to the Turks, a change much favored by the extreme facility with which the Turkish language is acquired. It was not till after the Crimean war that the massacres in the East called special attention to the existence of Z. and other Christian communities in the East which had some claim to European sympathy. An attempt by the Turks to settle Circassians near Z., gave Aziz Pasha of Marash an opportunity of attacking the Christians, and fearful atrocities were committed. The inhabitants defended themselves, however, with the greatest gallantry, twice defeating in the field large Turkish forces; and the struggle was at length terminated by the interference of the French and English governments at Constantinople, and the recall of the pasha. Unfortunately, the Turks were allowed to suppress the Armenian newspaper which acquainted the European public with what is taking place at Z., and little has been heard of it. But the Zeitunlis have from time to time to defend themselves against Turkish encroachment.

In 1862 the Zeitunlis were able to maintain their state of semi-independence, and to uphold the national flag of the Armenians. They successfully resisted Turkish attempts on their independence again in 1872, when they were driven into insurrection by their condition, and bravely defended their city; but, having accepted some crafty proposals of the Ottoman govt., they soon found Turkish officials in charge of their city. Once in possession the Turks, having found Z. almost impregnable, as a precau-

## ZEITUNLI—ZEL.

tionary measure against future uprisings, immediately built a modern fortress on a height commanding the city. Although the treaty of Berlin (1878) recognized the claims of the Armenians to better treatment, and the six Powers undertook to supervise the necessary reforms in the Armenian districts, yet nothing to ameliorate their condition was done. All that could instigate another revolt was done by the Turk, and in 1895 the Ottoman govt. instructed its officials at Marash to proceed to Z. and there seize all arms in the possession of the Zeitunlis. The latter refused to surrender their arms, and being attacked defended themselves so vigorously as to drive the Turks out of their city. The fighting continued for several days, and on Oct. 18 the Zeitunlis stormed the fortress, which they captured, making prisoners of 600 of the garrison. Shortly afterward Z. was surrounded by 40,000 Turkish troops and siege operations were begun. On Dec. 22 the city was bombarded and stormed, but the Turks were repulsed. In 1896 (Feb.) the consuls of the foreign Powers arranged with the revolted Armenians at Z. to give up their arms, retaining their hunting weapons, and to surrender their leaders; the Sultan promising to appoint a Christian governor. Five of the leaders on surrendering were led to the coast and expelled from the country, but Mahmoud Pasha, a Mohammedan instead of a Christian governor, was appointed at Z. 1896, Apr. 15. The Powers protested, and it was only after pressure had been brought on the Porte that he was replaced by a Christian (1896, June). The defense of Z. was most heroic. The city was crowded with refugees from the neighboring villages, 4,000 of whom died from sickness and want during the siege. Of the remainder of 12,000 refugees in Z. many were conveyed by the government to Marash, where they became objects for assault and abuse.

ZEITUNLI, *zī-tūn'lí*: a native or inhabitant of Zeitun (q. v.).

ZEITZ, *tsīts*: walled town of Prussian Saxony, govt. of Merseburg; on the Thuringian railway, 23 m. s.w. of Leipzig; in a pleasant and fruitful district, on a steep slope, on the right bank of the White Elster, over which there is a stone bridge. The town is very ancient, and has some good old public buildings; a cathedral and four other churches; a good library of 12,000 vols., besides MSS.; asylums for orphans and lunatics, an old and new castle, etc. There are manufactures of cotton, earthenware, leather, calicos, hosiery, gloves, etc.; and several print-fields, breweries, and distilleries. In the neighborhood are extensive mineral-oil works.—Pop. (1880) 18,265; (1885) 21,261.

ZEL, or ZELL, n. *zél* [Pers.]: an eastern instrument of music of the cymbal kind.



## ZELAYA—ZEMINDAR.

**ZELAYA**, *sā-lá'yá*: town of Mexico, state of Guana-juato; about 120 m. n.e. of the City of Mexico. It has a fine cathedral. There are manufactures of cotton and saddlery.—Pop. 14,000.

**ZELKOVA-TREE**, n. *zěl-kō'va-trē*: *Planera Richardi*, a N. Amer. tree, 70 or 80 ft. high, diameter of trunk four ft.; leaves like those of the elm, flowers small, greenish yellow, smelling like elder flowers; fruit small, with two seeds.

**ZEL'LE**, or **ZELL**: see **CELLE**.

**ZELLER**, *tsěl'ér*, **EDUARD**: German theologian and historian of philosophy: b. Würtemberg, 1814. He studied theology at Tübingen and Berlin, and became one of the ablest and most pronounced of Baur's disciples (see **BAUR**); hence his call to a theological chair at Berne 1847 aroused strong opposition from the orthodox. In 1849 he was removed to Marburg; 1862 became prof. of philos. at Heidelberg, and 1872 at Berlin. Latterly he has almost confined himself to philosophical studies. His principal work is *Die Philosophie der Griechen* (3 vols. 1844-52; 4th ed. 1876; Eng. transl. 1875). Other notable works are the book on the Acts of the Apostles (1854); *Das Theologische System Zwingli's* (1853); his essays (*Vorträge und Abhandlungen*, 2d ed. 1875); and his ed., with biography, of the works of his friend D. F. Strauss (1876-78).

**ZEMINDAR**, n. *zēm'in-dār'* [Pers.—from *zemin*, land, and *dar*, holding]: in *India*, a feudatory or landholder under government. **ZEM'INDARY**, n. *-dā-rī*, or **ZEM'INDAREE**, n., or **ZEM'INDARI**, n. *-rē*, the jurisdiction or district of a zemindar.—*Zemindars* under the Mogul rule in India were the governors of districts or large towns. Many of them occupied in India a position almost similar to the dukes and counts of w. Europe in the middle ages; they received, from their superiors, who were the nabobs or provincial governors, fiefs of more or less extent, for which they paid a certain due annually, being then exempted from all other imposts. The dues paid by the zemindars were of course exacted, with additions, from the ryots or cultivators, and constituted a large part of the imperial revenue. Under the British govt., the same system of tax-collection is continued in Bengal, the zemindars in that presidency being regarded as the hereditary lords or proprietors of their respective districts. The zemindars of the Coromandel district were formerly called *polyghars*. Under the zemindars were the *havildars*, or heads of villages, whose duty it was to collect their share of the tax imposed by the zemindar; and as, like their chief, they took care to collect an additional proportion for themselves, their exactions were commonly very oppressive, the 'nabob' pillaging the 'zemindars,' the 'zemindar' in turn plundering his 'havildars,' while the 'havildar' more than reimbursed himself at the expense of the Hindu villagers,

## ZENANA.

ZENANA, *zē-nā'na*: name of apartments devoted to women in the houses of India. In houses of the better classes, the front is occupied by men, and the rear, behind an open court, is assigned to women; the latter portion of the house is very inferior in the size and furnishing of the rooms. The number of married women, each with a separate husband, is often large (the sons being married early), and each occupies one small room, where she rears her children and lives a life much like that of a prisoner, though she can visit other rooms of women and the separate woman's court. The rooms have uncarpeted brick floors and are uncleanly; matting forms the bedding on a bedstead, while other appliances are few. The first story is used for work-rooms and cattle-stalls. A woman is not permitted to go abroad, except hidden in a palanquin, to pay a visit to her father's house. She learns no arts, except to cook for the husband, who receives the food at the hand of a servant in his own apartments, sending back the remains for his wife to eat. If she becomes a widow, she is not burned, as formerly, but is treated with contempt, and throughout her life is subject to great hardships. Except in Bengal, however, women are allowed some liberty. The reason given for the cruel seclusion is that it was necessary to protect women from the licentious Mohammedan conquerors of the country. Not till recent years were Christian women permitted access to their degraded sex in India. The Zanana Mission movement was founded 1852 under the auspices of the Prot. missionary societies in India, with the object of sending the gospel to the secluded women of India, by means of women missionaries; of alleviating their bodily sufferings in sickness, and ministering to their spiritual need, through the agency of duly qualified women medical missionaries who will be allowed access to them; and of promoting education, based on the Christian Scriptures, especially among women of the higher classes. The work has had considerable success.



## ZEND.

ZEND, n. *zēnd*: the anc. Persian tongue—the language of the Avesta or the ancient sacred books attributed to Zoroaster (q.v.). When the Avesta first became known through Anquetil-Duperron (q.v.), many scholars of eminence, like Jones, Meiner, Henning, Erskine, and others, warmly contested the age of these writings. They held that the idiom in which they were couched had never been spoken in any part of Persia, but was a Sanskrit dialect introduced from India for sacred use. The so-called Zoroastrian writings, they said, dated from the time of Ardeshir-Babegan, the first Sassanian, B.C. 230, or had at least been rewritten and redacted at that time. The first who endeavored to lay the foundations for a real grammatical knowledge of Zend was Rask, the Dane, who 1816 undertook a journey to India and Persia, to make researches into the origin and nature of this language on the spot. Though he did not live to make known all the results of his investigations, he yet proved that the sacred language of the Parsees was closely connected with that of the Brahmans; in other words, that Zend was akin to Sanskrit, and that, like the latter, it had retained some of the earliest formations of the Aryan dialects. Eugène Burnouf followed in his steps. He was indeed the real founder of Zend studies in modern Europe. By the aid of his knowledge of Sanskrit and comparative grammar, he proceeded to decipher, for the first time, the sacred writings of Zoroaster in the original; while Anquetil-Duperron, who first made the *Zend-Avesta* known in a European garb, did so from a modern Persian translation. Both he and Bopp contended for the independent and ancient existence of Zend, holding that Sanskrit, being a new language which came from the north, was more likely to be derived from the Zend than the Zend from Sanskrit. The opinion of Haug, the latest investigator, is, that Zend is almost identical with the most primitive—the Vedic—form of Sanskrit. The following sketch gives the results of his studies.

Zend, in its widest sense, embraces two so-called 'Bactrian' dialects, which, with the 'West Iranian' languages, i.e., those of ancient Media and Persia, form the stock of Iranian tongues. These tongues were spoken anciently in what the *Zend-Avesta* calls the 'Aryan countries' (*Áiryáo<sup>d</sup> danháwó*). The former, the 'East Iranian' or 'Bactrian' branch, has survived, in its two dialects, in the scanty fragments of the Parsee Scriptures only. The more ancient of them is called the 'Gâtha dialect,' because the largest and most important pieces preserved in this peculiar idiom are the Gâthas, or songs; the younger or 'ancient Bactrian,' also 'classical Zend language,' is the one in which the greater part of the *Zend-Avesta* (q.v.) is written. Both dialects seem to have died out B.C. 3d c., leaving no linguistic progeny. The general character of Zend, in its widest sense, is that of a highly developed idiom, inasmuch as it is as rich in inflections (there are no less than three numbers and eight cases) as is the Vedic Sanskrit, and is richer even than the Latin in the variety

of forms inherent in its verbs and nouns. There are numbers of compound words in it; and the whole syntax bears the stamp of an advanced stage of linguistic progress. A genuine sister of Sanskrit, Greek, Latin, and Gothic, it is yet known to us, much as is the Hebrew, in only its declining phase. The forms are no longer accurately kept distinct, and a return to the originally uninflected state is noticeable, principally in the verbs. It may be that the Bactrian grammar had never been properly fixed by rules, and that, in the absence of that tender care which the Brahmans took of the preservation of the Sanskrit texts and idiom, many corruptions and abbreviations gradually crept from the colloquial into the classical language of Zend, and were thus perpetuated in the surviving remnants. As soon as the language of the Zoroastrian books died out from daily use, these books were mechanically copied, time after time; and numerous blunders, unchecked by an understanding of the structure or the details of the language, crept in unheeded. The oldest copies are the best, comparatively speaking: the more modern the copy, the oftener the terminations are found as separate words; vowels are inserted according to the faulty pronunciation of the writer; and a number of other faults of omission or commission are patent at first sight, due solely to carelessness and ignorance. The two dialects of Zend differ both phonetically and grammatically; and the phonetical differences are so great that at first sight it appears almost as if they were caused by different localities rather than different ages; but closer inspection shows that the singling of the Gâthas, whereby certain vowels were lengthened, has caused many of these striking peculiarities. Grammatically, the Gâtha dialects show many deviations from Zend, traceable to the more primitive state of the Bactrian language which it represents. But the differences between the two are not so great as between the Vedic and the classical Sanskrit, and between the Greek of Homer and the Attic dialect. At most, the Gâtha may be reckoned one or two hundred years older than that classical Zend which formed the classical language of the ancient Iranian empire, as depicted in the earlier parts of the *Shâh Nâmeh*.

There are 12 simple vowels and about 14 diphthongs in Zend, for each of which there are special characters. Of vowels peculiar to this idiom may be mentioned the *ā* (long, with nasal sound), used chiefly in the genitive plural termination; further, the *ē*, which, in the Gâtha dialect, often replaces the final *ō* of the usual Zend, and which, by the frequency with which writers confound it with *ī*, also proves itself closely allied to that sound. There is, further, an initial *a*, which probably crept into the Zend texts when they were transcribed into their present characters, which are doubtless drawn from the Syriac. This *a* corresponds to the Aleph prostheticon of the Semitic idioms. Again, the short vowels are always lengthened at the end of a word in the Gâtha dialect: owing probably to the fact that the Gâtha literature—the most sacred hymns—was sung, and the singer's voice resting upon the final



## ZEND.

vowel, whether long or short, had the effect of lengthening it even in the MSS., written mostly from memory. Of consonants there are 6 gutturals, 2 palatals, 4 dentals, 3 labials, 4 semi-vowels, 5 sibilants, 5 nasals. The roots are mostly monosyllabic, consisting occasionally of one vowel only, or being a combination of a vowel with a simple or double consonant, or of two consonants with a vowel between them—e.g., *i*, to go; *dā*, to give; *gā*, to go; *mere*, to die; *az*, to be; etc. Additional sounds added to the simple roots enlarge and otherwise change the meaning of a word—*dā*, to make, becomes, by the addition of *th*, *dath*, to place; from *mere*, to die, is derived *mereñch* to kill. Three chief modifications are noticed in the verbal roots, irrespective of tense and mood—viz. the ‘causal form,’ expressing the idea of ‘to make,’ ‘to get made,’ which is formed by lengthening the vowel of the root, and adding the syllable *aya*, as in Sanskrit. Next stands the desiderative form, expressing the wish of obtaining anything, which is formed by reduplication of the first syllable, and addition of *s* to the crude form before the terminations. The last or intensive form, used to render the verb more emphatic, was produced originally by simple reduplication of the root and the termination; afterward only the vowel of the first part was lengthened, and the consonants following were omitted. Three voices—the active, middle or reflective (L. deponent), and the passive—obtain in Zend, as in Greek and Sanskrit; and there are four chief moods, which may be used in all these three voices—the indicative, subjunctive, potential, and imperative. The subjunctive is of double nature, one expressing the ‘might, would, or should,’ the other the ‘may’—a feature lost in classical Sanskrit, and met in only the ancient language of the Vedas. The potential, too, is of two kinds, corresponding to the Sanskrit ‘potential’ and ‘precativ.’ There are as many tenses in Zend as in Sanskrit, though fewer than in Greek, which is in this respect the richest of the Aryan stock. There may be distinguished one formation for the present, four for the past, and two for the future.

The general scheme of the (active) present and imperfect is as follows:

PRESENT.	IMPERFECT.
<i>Active Voice.</i>	<i>Active Voice.</i>
Sing. 1. <i>mi.</i>	Sing. 1. <i>m.</i>
2. <i>hi.</i>	2. <i>s, ô.</i>
3. <i>ti.</i>	3. <i>t.</i>
Dual 1. <i>vahi.</i>	Dual 1. <i>âva.</i>
2. (lost.)	2. (lost.)
3. <i>tô, thô.</i>	3. <i>tem.</i>
Plur. 1. <i>mahi.</i>	Plur. 1. <i>ma.</i>
2. <i>tha, dûm.</i>	2. <i>ta.</i>
3. <i>ñti.</i>	3. <i>en, añ.</i>

The division of the ‘crude’ forms into ten classes, in use with the grammarians of Sanskrit, is also fully applicable to the Zend. Additions and reduplication make up the distinguishing features. The past tenses are likewise formed, as in the sister tongues, by augmentation, reduplication, or

composition. Apart from forms identical with those in Sanskrit, Greek and Lithuanian, Latin, and the ancient Teutonic languages, we find the use of two kinds of subjunctives. Equal richness of forms is found in the participle and the infinitive, while there are fewer gerundial forms than in Sanskrit. Nouns are formed out of roots by addition of suffixes, which generally correspond to those of the cognate languages. There are three genders in Zend—masculine, feminine, and neuter. The comparative and superlative are formed very nearly as in Sanskrit and Greek. The number of compound nouns in Zend is somewhat less than in the Sanskrit and Greek, on account of its standing nearer the more simple Vedic idiom. There are three numbers and eight cases of inflection for singular and plural of nouns; while there are no less than five cases in the dual, no other Aryan language having retained more than three. The terminations of the cases (in words ending with a consonant) are somewhat according to the following scheme:

	SING.	DUAL.	PLURAL.
Nom.	s.	{ a.	ô (aç).
Accus.	em.	{ a.	ô, âs
Instr.	a.	{ bya.	bis.
Dat.	ê.	{ bya.	byô (byaç).
Ablat.	at.	{ âo.	byô.
Gen.	ô (aç).	{ âo.	âm.
Locat.	i.	yô.	aêshu, aêshva, hva.
Voc.	= Nom.	“	

There are pronouns of only the first and second persons found in Zend, the third person being made up by a demonstrative pronoun. There are some older forms found in the Gâtha dialect only. Most of the pronouns resemble closely the Sanskrit forms. The relative is used sometimes as a demonstrative. The numerals from 1 to 10 are: aêva, dva (va, dugê, ayê), thri, chathware, poñcha (meñda), khshvas (khshvîdem), hapta, asta, nava, daça. The following numbers are formed by addition of the single cardinal numbers to the ten or daça: 20 = viçaiti, 100 = çatem, 200 = duye çaitê, 1,000 = hazanra, 10,000 = baêvare, 100,000 = ahôkhsta. The ordinals are: paoirya, first; bitya, second; thritya, third; khtûirya, fourth; pukhdha, fifth; etc. ‘Multiplication numerals’ are formed by addition of *keret* and *vat*—e.g., hakeret, once; bizhvat, twice; thrizhvat, thrice; etc. Particles and prepositions are often identical with those of Sanskrit. The latter may be separated from the verb, if forming part of it, as is the case in the Vedic and Homeric languages but not in classic Sanskrit or Greek.

We have started with the now fully proved assertion that Zend is closely allied to Sanskrit, especially to the ancient Vedic dialect. To the latter it bears about the same affinity which the different Greek dialects (Æolic, Doric, Ionic, Attic) bear to one another. The ancient Brahmans and the Parsees are but two tribes of the nation which is called Aryas both in the *Veda* and *Zend-Avesta*, the former somewhat to be compared to the Ionians, the latter to the Dorians. But in comparing Zend with San-



skrit, it is noticeable that it resembles more the primitive Vedic than the classical Sanskrit. In verbal forms, chiefly moods and tenses, the classical Sanskrit is much poorer than it is in its primitive Vedic phase, having lost various forms of the subjunctive mood, most tenses of all other moods except indicative, the manifold forms expressing the infinitive mood; while all these are found completely preserved in the *Vedas*, *Zend-Avesta*, and Homeric Greek. These and many other signs indicate that the classical Sanskrit was formed long after the separation of the Iranians from the Hindus. The differences between the Vedic, Sanskrit, and Zend are very minute in grammar, but important both phonetically and lexicographically, like the difference between German and Dutch. But the philologist can easily transform, by slight phonetic changes, the Zend word into the Sanskrit one. A striking proof of the original identity of grammatical forms between the two is seen in their both exhibiting certain identical irregularities.

For *Zend Literature*, see PERSIAN LANGUAGE AND LITERATURE: ZEND-AVESTA. We here mention only the principal items. At the head stand the five Gâthas, which may safely be ascribed to Zoroaster and his disciples themselves. There is no doubt that what now survives is but a scanty fragment of this literature. Probably they but represent a selection of verses considered most efficacious for putting down evil influences, and for increasing the welfare of the Zarathustrians. The Gâthas, as they now stand, may be compared to the Sâmaveda, which contains selections from the Rigveda, used at the Soma sacrifices. Next in order stand the Yasna, or seven chapters, containing songs and prayers, which dates from a much later period; and here again the first portion, or 'Younger Yasna,' is of still later date; and on the same line stands the Visparad, the collection of prayers called 'All Heads,' in 23 chapters. The Vendidad, on the other hand, represents conversations held by Zoroaster with Aburamazda on religious topics, and is most likely the work of the high-priests of the Iranian community of later periods. The Yashts, or songs and conversations, are the latest. The age of the different works mentioned is fixed by Haug in the following manner: the Gâthas about B.C. 900 or 1200; the larger portion of the Vendidad at about B.C. 900 or 1000; the younger Yasna, about B.C. 700-800; the latest part of the Vendidad (the Pazend) being written as late as B.C. 500, when the collection of the different parts also seems to have taken place. This computation would give the Zend, or rather the famed Parsee literature, a range of about 800 years, B.C. 1200-400. Cf. Haug's *Essays on the Religion of the Parsees* (Bombay 1862).—See PERSIAN LANGUAGE AND LITERATURE; ZEND-AVESTA; ZOROASTER.

ZEND-AVESTA, *zēnd-â-vēs'tā*, or (as the Pehlvi books have it) AVESTA-ZEND: the sacred writings of the Parsees (q.v.). The word Avesta (*avasthā*) means text, scripture; Zend, or Zand, translation or commentary *and* paraphrase. According to the latest researches, it seems that only a small portion of the entire collection now extant was formed of Avesta or text, the rest being made up of Zend or commentary, without text. The term Zend has indeed changed its meaning repeatedly. From an authoritative interpretation, emanating from the highest source, in time becoming embodied in the text itself, it came later to denote a translation into the native idiom of Persia (the Pehlvi), made by the Zoroastrian priests during the Sassanian period. There is further a special 'Zend doctrine' to be noticed, which differs considerably from that contained in the Avesta. A still further explanation of that Zend doctrine is the Pâzend, a word often met in connection with Avesta and Zend. Of this we shall further have occasion to speak.

Before proceeding with an elucidation of the contents and purport of these Zend writings, we glance at their history, or rather at the different phases through which the acquaintance with them on the part of the West has passed. The doctrine of the 'Magi,' as the ancient world was wont to call the priests of Zoroastrianism, as well as those of India, Persia, and Babylonia, is alluded to first in the prophecy of Jeremiah, where the chief of the Magi is mentioned among Nebuchadnezzar's retinue. In the new Test. (Matt. ii. 1), Magi come to worship the Lord Jesus at Bethlehem. The earliest account among Greek writers is furnished by Herodotus, who, on the whole, seems well informed for his time. Besides his account we hear of accounts by Ctesias, the Greek physician of Artaxerxes II., by Deinon, Theopompos, and Hermippos; but only fragments from their writings have survived, imbedded chiefly in Plutarch and Diogenes Laertius. Pliny, Strabo, Pausanias, Dion Chrysostomus further enlarged the stores of knowledge, which, more or less trustworthy, may be gathered from independent sources. Omitting later Greek writers, such as Damascius, Theodorus of Mopsuestia, etc., we turn to Armenian writers of the 5th c.: among them we find Ez-nik and Elizæus, from whose records we gather that the Zoroastrians at their time were split into two parties, one called Mog, the other Zendik; the former inhabiting chiefly the western parts—Media and Persia principally acknowledging the Avesta; while the latter, living principally in the east (in Bactria), followed the traditional explanations, or Zend proper. To the Arabic writer Masudi (950) we owe a comparatively correct account of the sacred book; while Sharastani (1153) is perhaps the first among his countrymen who ranks the Zoroastrians with those other professors of Semitic creeds, the Mohammedans, Jews, and Christians, and not among the idolaters and pagans. In his time they were already split into many sects, those who believed in the transmigration of souls, like the Brahmans, Buddhists, etc. As a successful piece of deception, it is to be noticed that Mohammedan writers mostly seem to



## ZEND-AVESTA.

countenance the fable palmed upon them during the times of persecution by the Magi, that Zoroaster was identical with Abraham—in which there is not one atom of truth. The nations of modern Europe came into contact with the adherents of Zoroastrianism in w. India, and in the 17th c. some MSS. of their sacred books were brought to England; but no one was able to read them; and Hyde himself, the celebrated Oxford scholar, was unable to make any use of them when, 1700, he wrote his learned work on the Persian religion. A sort of romantic freak first put Europe in possession of the key to this book, whose language had been lost more than a thousand years. A young Frenchman, Anquetil-Duperron, happened to see a few pages that had been copied from a Zend MS. in the Bodleian Library, and he instantly resolved to betake himself to India in quest of the original Zend writings. To achieve this purpose, he, being without means, had to go as a sailor on a ship belonging to the French India Company, bound for Bombay 1754. The French govt., however, soon afterward took part in the affair, and furnished him both with money to purchase MSS., and with a pension, that he might pursue his studies with greater ease. He prevailed on several of the dusturs, or learned priests, to introduce him into the mysteries of the holy language and rites, and further to sell him some of the most valuable works couched in it. When he considered himself sufficiently competent in Pehlvi and Zend, he commenced a translation of the whole Zend-Avesta in French 1759. Two years later he returned to Europe; and having convinced himself, by comparison with the Oxford MSS., that those he had acquired of the sacred writings were genuine, he went to Paris, where he deposited his treasures—180 MSS. in different oriental languages; and published, ten years after leaving India (1771), the first European translation of the Zend-Avesta, to which was added much supplementary matter. The work created a profound sensation throughout Europe; but after a while voices began to be heard less favorable than had been anticipated by the bold and persevering discoverer. Apart from the objections raised against the new book by Immanuel Kant the philosopher, on the score of its not containing any traces of philosophy, a much graver question was ventilated in England—viz., that of its authenticity. It was not that Anquetil was charged with forgery, but the priests, it was said, had found in him a ready dupe. It was principally Sir William Jones, who, in a trenchant letter addressed to Anquetil-Duperron (in French, being, as Sir William Jones said, the only language which Anquetil understood—a *little*), tried to prove the utter untrustworthiness of the whole work. He was aided therein by Richardson, Persian lexicographer, who, from four reasons—none of which however, is valid—came to the conclusion that the book was a spurious fabrication. While in France there was but one opinion on the subject—viz., that English scholars were trying to run down the work out of sheer spite and jealousy. the opinions of Germany were rather divided. Some, like Meiners and Tych-

sen, fully acceded to the proofs arrayed against it; but there arose another renowned German scholar, Klenker, who, in token of his complete and unreserved trust in the genuineness, set about translating Anquetil's French translation into German, adding several appendices, etc., and principally pointing out the now generally recognized agreement between the more important heads of the doctrines as contained in the book and in the classical writers. Thus matters stood for a long while. In Germany Anquetil's translation, as rendered by Klenker, became the standard work even for theologians; in England, none any longer thought about it, full agreement having been reached by the highest authorities that it was nothing but a clumsy forgery. More than 50 years had elapsed from the appearance of that work, when a Dane, Rask, undertook to look into the matter. Having himself acquired many Zend and Pehlvi MSS. in Bombay for the Copenhagen library, he wrote (1826) a pamphlet, in which he first showed not only the close affinity between the language of the Zend-Avesta and Sanskrit—which had been pointed out by Erskine and others before; and further proved it to be, not a corruption of Sanskrit, but a distinct language. He proved also that modern Persian was derived from Zend, as Italian from Latin—a step which at once removed all doubts about the genuineness of the work, while showing how, to a certain extent, Anquetil, to whom high praise was due for having been the first pioneer, had, through the absence of the requisite philological aids, been occasionally woefully misled in his version. The learned dustur himself—with whom Anquetil communicated only in Persian—though well acquainted with the Parsee traditions, and favoring mostly the general sense of the passages, yet had no grammatical knowledge whatsoever of the language that he pretended to teach. Rask had pointed out the way; Eugène Burnouf followed it. He indeed may be called the founder of Zend philology. For more than 20 years this eminent scholar devoted all his energies to elucidating, commenting, and discussing this language and the sacred writings couched in it, and in publishing texts and translations. In Germany, Ols-hausen, Bopp, Müller, Brockhaus, Spiegel, Haug; in Copenhagen, Westergaard, have been busy ever since in editing and translating either portions of or the entire Zend-Avesta; and though the rediscovery of the language is far from accomplished, yet their indefatigable labors have given us the key to the facts connected with the language and its sacred depository, the Zend-Avesta.

We turn to the book itself. We know, both from the Parsee traditions and from independent classical witnesses, that the Zend-Avesta was originally of vast extent, incomparably vaster than the work that now exists under that name. Pliny speaks of 2,000,000 verses composed by Zoroaster; and an Arabic writer, Attavari, mentions the number of 12,000 cowskins (parchments) of which Zoroaster's writings consisted. No doubt these are round Eastern figures; but it may safely be assumed that the sacred liter-



ature in question must have been of very great extent. The Parsees ascribe its loss to Alexander the Great, but it is more likely that their traditions in that respect refer to the Mohammedan conquests. Yet even then the greater part of the sacred literature was already lost, and the date of Alexander may so far be correct, that the Greek ideas that followed in his wake turned the believing minds from the primitive faith, and carried with it a gradual neglect and loss of the documents in which it was contained. For 500 years—from the Macedonian conquest B.C. 335, to the accession of the Sassanians to the throne of Iran A.D. 235—the Zoroastrian religion was not supported by any kings, and decayed in consequence. But when the Sassanians assumed the rule, their principal endeavors were directed to the revival of the ancient faith; and their unceasing researches after the ancient fragments of the Zoroastrian gospel have resulted in the small collection which we now possess. Yet the names and the summaries at least of all or most of the lost portions have survived. The whole scripture is reported to have consisted of 21 nosks, or parts, each containing Avesta and Zend—that is, text and commentary on it. The number 21 was to correspond to the 21 words of which the most sacred prayer of the Zoroastrians (the Honovar) was composed. The 1st of these sections comprised 33 chapters, containing the praise and worship of angels; the 2d (22 chapters) contained prayers and instructions to men about good actions; the 3d (22 chapters), an explanation of religious duties and commandments, and the way to avoid hell and acquire paradise; the 4th (22 chapters), knowledge of both this and the future worlds and their inhabitants, revelations concerning heaven, earth, water, trees, fire, men, and beasts, the resurrection of the dead, and the passing of the bridge Chinvat; the 5th (35 chapters) treated of astronomy, geography, astrology; the 6th (22 chapters), of food, lawful and forbidden; the 7th (50 chapters, of which, at the time of Alexander, only 13 were extant) treated of the different head or chiefs in the creation; and the 8th (60 chapters) contained a code of laws for kings, governors, etc.—also a portion about the sin of lying; the 9th (60 chapters) treated of metaphysics, natural philosophy, divinity, etc.; the 10th (60 chapters) treated of the reign of King Gustasp, and his conversion to the religion, and its propagation by him through the world; etc. Of all the 21 nosks, however, one only, the 20th (in 22 chapters), called the Vendidad, has survived complete. This treats of the removal of uncleanness of every description, from which great evils arise in the world. Some fragments of the other parts only, chiefly the 4th and 11th, have survived. But there are now in sacred use among the Parsees other books either not included in the foregoing list, or imperfectly indicated in it. Of the former are the Yazna (Izeshne) and the Visparad (Visporatu). To the latter class belong 24 sections called Yashts, and some small prayers of different kinds, such as Afrigân, Nijâyish, Gâhs, and Sirozah, or Calendar. As to the authorship of these books, to which we now proceed, see further ZORO-

ASTER. By unanimous consent of both classical writers and the Persians, the whole bulk of the sacred literature is ascribed to Zoroaster himself. They were supposed to be the substance, or, as was held afterward, the very words of revelations from God to the prophet, in the form of conversations. These revelations do not appear to have been at first committed to writing, but to have been orally preserved by his disciples and adherents, and to have been handed down by them to posterity. Surprising as this may seem at the sight of what has remained, as at the thought of the infinitely larger bulk of what has perished, it must be borne in mind that, e.g., the Vedas, the Talmud, and the Sunnah have been preserved equally faithfully in the mouths of many generations. The name Zoroaster or Zarathustra—in as far as to him is ascribed the authorship of the whole of the sacred writings—is to be taken collectively rather than individually, i.e., as indicating a school of successors and high-priests of the founder, who is designated Zarathustra *Spitamā*; while the chief divines who took his place in their after-times were called only Zarathustra. That their decisions and sayings were afterward ‘hedged in’ with the same reverence as those of the founder himself, need not be argued at length. All that can really be held to emanate from the prophet himself are the five *Gāthas*, which form part of the *Yazna* [Skr. *yajna*, sacrifice]. This *Yazna* consists principally of prayers to be recited at the sacrificial rites—such as the consecration of the *Zoōthra*, or holy water; of the *Bareçona*, or bundle of twigs of a particular tree; the preparation of the sacred juice of a plant called *homa*—the Indian *Soma* (q.v.)—taken to be an emblem of immortality; the offering of certain cakes; etc. The whole of the *Yazna* now comprises 72 chapters, probably corresponding to the (12 times 6) ‘seasons’ during which Ahuramazda created the world. It consists apparently of two parts belonging to different periods. The older is written in what Haug calls the *Gātha* dialect (see *ZEND*), and was considered sacred even at the time when the other books of the *Zend-Avesta* were composed. This ‘older *Yazna*’ was divided again into the *Gāthas* and some minor pieces. The former, five in number, are small collections of (metrical) sacred prayers, songs, and hymns, exhibiting philosophical and abstract thoughts about metaphysical subjects. The name itself signifies ‘song.’ Their metre resembles chiefly that of the Vedic hymns. They are without rhymes, and only the syllables are counted. The first bears the heading (which is intended also for the other four), ‘The Revealed Thought, the Revealed Word, the Revealed Deed of Zarathustra the Holy; the Archangels first sang the *Gāthas*.’ They all are more or less devoted to exhortations by the prophet to forsake polytheism (the *devas*, or gods), and to bow only before Ahuramazda. The difference between monotheism and idolatry is pointed out in the respective sources whence they flow—viz., ‘existence’ and ‘non-existence.’ The mission, activity, and teaching of Zoroaster are presented more or less in all *Gāthas*, but chiefly in the



second. To the other portion belongs further the 'Yazna of seven chapters,' which seems to have been composed by early disciples, and which consists of prayers in prose, addressed to Ahuramazda, the angels, the fire, the earth, the waters, and other spiritual beings—genii presiding over different parts of the good creation; further, over devotion, speech, etc. There is also a chapter containing a formula by which the ancient Iranians were received into the new religious community. The so-called younger Yazna, written in the common Zend language, is of more varied contents, such as an invitation to Ahuramazda and all the good spirits to be present at the sacrifice; further, pieces referring to the preparation and drinking of the homa juice; next, the praises of the genius Serosh, and a commentary on the most sacred prayers. The *Visparad*, which forms the next most important part of the Zend-Avesta contains a collection of prayers, composed of 23 chapters, written in Zend (not Gâtha), and resembling the younger Yazna. They refer to the same ceremonies—the preparation of the sacred water, consecration of certain offerings, etc. Next are to be considered the *Yashts*, in 24 divisions. *Yasht* (*yêsti*) means worship by prayers and sacrifices, and in the Avesta indicates certain laudations of sacred persons and objects—yazatas (*izad*) = angels; and so far differs in nature from the invocations in the Yazna and Visparad, that, while in the latter the divine beings are invited promiscuously, the single Yashts are addressed to individual numina, such as the archangels, the sun, the heavenly water, the star Tisfrya, etc. In these songs—the work of Median bards, probably—are found also the primary sources of the legends contained in the Shâh-nâmeh (q.v.). Some minor pieces are now used as common prayers by the Parsees, such as the five *Nijâyish*, or praises, addressed to the sun, the moon, the water, and the fire; the *Afrigâns*, or blessings to be recited over a certain meal prepared for an angel or a deceased person; the five *Gâhs*, or prayers to the angels set over the five different times of the day and night; and finally, the *Sirozah*, or 30 days, being a calendar, or rather an enumeration of the 30 divine beings that preside over each of the days: it is recited chiefly on the 30th day after a person's death. The *Vendidad*, to which we now turn, is the 'Pentateuch' of the Zoroastrian canon, the code of religious, civil, and criminal laws of the ancient Iranians. It consists of 22 chapters or fargards = sections. It seems to have survived in a fragmentary state only, and is evidently the work of many hands and many centuries. It appears as if, starting from old sayings in the Avesta, the Iranian high-priests in various periods had interpreted them often at variance with each other: these their interpretations (Zend) were made the theme of further interpretations (Pâzend), and the three phases of interpretation were received in the course of time as equally authoritative among the faithful. There are three parts to be distinguished in the Vendidad. The first is introductory, containing an enumeration of 16 Aryan countries over which the Zoroastrian religion was spread; further, legends

## ZENDIK—ZENO.

of King Yuria, and recommendations of agriculture. The second part (chaps. 4-17) forms, as it were, the groundwork of the *Vendidad*, treating of laws, ceremonies, and observances. The third part is a kind of appendix, treating of various subjects, chiefly medical, such as spells against diseases, etc. Here ought to be mentioned also the *Bundehesh*, written entirely in Pehlvi, which seems a compilation of several extracts and fragments of partly ancient, partly recent Zoroastrian writings, forming a sort of compendium or dogmatic handbook of Zoroastrianism. For an account of Zoroastrianism, see GUEBRES: PARSEE: ZOROASTER.—Burnouf, *Vendidad-Sadé*; Olshausen, *Vendidad Zend-Avestæ*—French transl. by Anquetil-Duperron, German by Klenker; Spiegel (German text, with Spiegel's commentary, retransl. into English by Bleek); Rask, *Alter und Æchtheit der Zendsprache*; Haug, *Essays*; etc.

**ZENDIK**, n. *zěn'dík* [Arab., an infidel, an atheist]: name given in the East not only to disbelievers in revealed religion, but also to such as are accused of magical heresy.

**ZENGG**, *zèng*, or **SENJ**, or **SEGNIA**: important free port of the Austrian empire, in Croatia, on the Adriatic; 71 m. s.e. of Trieste, at the termination of the Josephine Road, opposite the island of Veglia. Z. is the see of a Rom. Cath. bp.; has a large and elegant cathedral, an upper gymnasium, a seminary for priests, an academy, and school of navigation; a small harbor (free), somewhat unsafe; and some trade in grain, honey, wax, wine, salt, tobacco, wood, fish, and cattle.—Pop. 3,500.

**ZENITH**, n. *zē'nīth*, or *zěn'īth* [F. *zénith*: Sp. *zenit*—prob. corruption of Ar. *sant*, quarter, region; *sant-ur-ras*, the head region, the zenith]: the top of the heavens; the point in the heavens directly over a spectator's head, i.e., in line with the spectator's position and the centre of the earth—the *nadir* being the point directly opposite, or that under a spectator's feet; the highest or culminating point of any subject referred to. **ZENITH DISTANCE**, the distance of a heavenly body from the zenith. **ZE'NITHAL**, a. *-nīth-āl*, of or pertaining to the zenith.

**ZENJAN**, *zěn-jân'*: populous and thriving town of Persia, province of Irak-Ajemi; about 170 m. n.w. of Teheran, 70 m. s.s.w. of the Caspian Sea; on the table-land of Azerbaijan, at the junction of the roads from Hamadan and Teheran to Tabriz; on a tributary of the Kizil-Ouzen, which flows into the Caspian. It is surrounded by orchards; has old walls, a palace, a mosque, bazaars, and trade in carpets, woolen cloths, arms, lead, and gunpowder.—Pop. estimated 15,000.

**ZENO**, *zē'nō*, **NICOLO**: navigator and discoverer: about 1340—about 1391; b. Venice; of patrician family. About 1375 he voyaged to the northern seas, but was wrecked. Afterward, with his brother Antonio Z., he visited Greenland and Newfoundland; and with some fishermen sailed southward along the coast, it is claimed as far as Virginia. He died in Newfoundland. Z. sent to another brother, Carlo, Vene-



tian grand-admiral, frequent reports of his discoveries, and wrote an account of them; but his papers were burned by his young grand-nephew. This youth afterward seeking to repair the loss occasioned by his rashness compiled—with the aid of a few letters that had been sent to the grand-admiral Carlo and had been preserved—a narrative (pub. Venice 1558, with map dated 1390). This whole story of Z., his voyages, his papers, and his very existence, was long discredited; but it has now been proved that Z.'s letters and map were known to exist 30 years before their publication (see an Eng. transl. pub. by the Hakuyt Soc., with introduction and notes, London 1873). Z.'s map of the n. coast is surprisingly correct; and his account, so far as preserved, confirms the notices by Adam of Bremen (11th c.) and by Vitalis (12th c.) of Scandinavian colonies in N. America more than a hundred years before the discovery by Columbus.

ZENO, *zē'nō*, OF CITIUM, *sīsh'ī-ūm*: founder of the Stoic philosophy: lived in the last part of B.C. 4th c. and early part of B.C. 3d c. (dates uncertain); b. at Citium, in Cyprus. He was a contemporary of Epicurus. His father was a merchant, and on his trading voyages brought home with him from Athens some writings of the Socratic school. By these Z. is said to have been attracted to the study of philosophy. At the age of 30 he was shipwrecked off the coast of Athens, and having lost his property he willingly adopted the Cynic doctrines, in which contempt for riches is conspicuously taught. He attached himself first to Crates, but soon became dissatisfied with the coarse, ostentatious disregard for established usages, and the indifference to speculative inquiry, which characterize the Cynic sect. He next joined the school of the Megaric Stilpo, and there became proficient in the art of disputation. Still unsatisfied, he betook himself to Polemo the Academician. Having thus made himself master of the tenets of the various schools, he proceeded to open a school for himself, wherein he might show forth the result of all his inquiry, and develop his own peculiar system: see STOIC. He selected for the purpose the 'Painted Porch' (*Stoa Poikile*), from which his sect has got its name, and there, till his 98th year, as is said, continued to teach those doctrines which, in spite of serious drawbacks, inculcate that manly energy and simplicity, fortitude under suffering, and reverence for moral worth, which made disciples of so many of the noblest characters among the Romans. As a man, Z. deserved and gained high respect. The Athenians honored him with a gold crown and a public burial, and his countrymen erected a monumental pillar to his honor. Of his numerous writings scarcely anything remains save the titles.

ZE'NO OF ELEA, *ē'lē-a*: philosopher of Elea, a town of Lucania, in Italy, favorite disciple of Parmenides: b. conjecturally near the beginning of B.C. 5th c. He visited Athens, and the illustrious Pericles was one of his pupils. According to the account usually given, on his return to Elea he joined a conspiracy to deliver his native town from the tyrant Nearchus, and on the failure of his plot was

## ZENOBIA.

captured and put to the torture. On being interrogated as to his accomplices, he named the principal courtiers, and is said to have bit his tongue off, and spat it in the tyrant's face. Historical evidence for this account is lacking; and whether Z. perished in his attempt or survived the tyrant is uncertain. He held the usual doctrines of the Eleatic school respecting the unity and the immutability of all things, distrust in knowledge acquired through the senses, and reliance on pure reason. Phenomena or appearances he maintained were not real existences: in this he anticipated the Berkeleyan theory. His argument dealt in paradoxes which have been the standard puzzles for tyros in philosophy ever since: e.g., if the fleet Achilles be pursuing a tortoise that has the start of him, Achilles can never overtake the tortoise; for while Achilles traverses the distance from his starting-point to the starting-point of the tortoise, the tortoise advances a certain distance; and while Achilles is traversing this distance, the tortoise makes a further advance; and so on *ad infinitum*: consequently Achilles may run on forever without overtaking the tortoise. His paradoxes, amounting to denials of all human speech or thought, involved a comprehensive skepticism. Still his speculations had an educational influence on Greek philosophy; and he is remarkable chiefly for having been the first to employ the style of argument known by the name Dialectic, in which error is refuted, and truth established, by the *reductio ad absurdum*—a method skilfully employed afterward by Socrates and Plato. He devoted his great powers of argumentation to enforce the doctrines first broached by Xenophanes and more systematically developed by Parmenides. His works were in prose, but only small fragments have been preserved.

ZENOBIA, *zē-nō'bī-a*, Queen of Palmyra: reigned 267-272; succeeding her husband, Odenatus, who had been permitted by Gallienus to act as his colleague in the Roman empire, though without official Roman acknowledgment. Z.'s rare ability as an administrator, with her brilliant physical and intellectual gifts, had greatly contributed to the strength of her husband's sway; and she had held firmly in her hands the reins of government during his long absences in war. At his death by assassination she asserted her regal claim, and nearly the whole of the eastern provinces submitted to her sway. But Aurelian, having assumed the purple, and being in command of a powerful army, marched against her, and, after defeating her in several battles, besieged her in Palmyra. Her hopes of being relieved by the Persians and Arabians being disappointed, she attempted to escape by flight, but was captured 272. Her counselors, chief of whom was the celebrated Longinus, were beheaded; and Z. was led in triumphal procession at Rome, decked with splendid jewels, and almost fainting under the weight of gold chains. She was presented by her conqueror with large possessions near Tivoli, where, in the society of her two sons, Heronnius and Timolaus, she passed the rest of her life in comfort and even splendor. She was a woman of great courage, high spirit, and strik-



ingly beautiful. With purity of morals in private life, she combined prudence, justice, and liberality in her administration. Her literary acquirements were considerable; she spoke Latin and Greek, as well as the oriental languages, with fluency. The balance of authority is said to be in favor of the belief that she was an adherent of the Jewish faith; and she is known to have been a friend and patroness of the Monarchian bp. Paul of Samosata.

ZENTA, or SZENTA, *sĕn'tōh*: town of Hungary, county of Bacs; on the right bank near the Theiss, 120 m. s.s.e. of Pesth, in a beautiful plain. It is notable for the victory of Prince Eugene over the Turks 1696. Cattle-breeding is carried on; and the people are entirely agricultural.—Pop. (1880) 21,200; (1886) 16,000.

ZEOLITE, n. *zĕ'ō-līt* [Gr. *zeō*, I boil; *lithos*, a stone]: generic name for a group of minerals, consisting of hydrated silicates, so called from their frothing or intumescenting into a whitish spongy enamel under the blow-pipe. ZE'OLIT'IC, a. *-līt'īk*, pert. to or resembling zeolite. ZE'OLIT'IFORM, a. *-ī-fa'orm*, like zeolite in form.—The *Zeolites* all are soluble in acids, and most of them gelatinize in acids in consequence of silica being set free. They are hydrated silicates of alkalis or alkaline earths, most of them containing alumina. Magnesia is rarely present. Their composition, however, is very various. They are generally found in amygdaloidal cavities, formed by steam, or in fissures of trap and other intrusive rocks, also in granite and gneiss, apparently as deposits from water percolating through the rock. They sometimes, but rarely, occur in veins. They are found either in crystals or of crystalline structure, often in plates or fine scales, often in needles or fibrous. Among them are *Analcite*, *Natrolite* or *Mesotype*, *Scolezite* or *Needlestone* (*Needle Zeolite*), *Stilbite*, *Heulandite*, *Brewsterite*, *Apophyllite*, *Chabasite*, *Harmotome*, or *Cross-stone*, and *Laumonite*.

ZEPHANIAH, *zĕf-a-nī'a* [Heb., 'whom Jehovah hides or protects,' or, by another derivation, a 'watcher of the Lord']: one of the minor Hebrew prophets: lived during the reign of Josiah, of Judah, in the latter part of B.C. 7th c., and apparently before the 18th year of that king, B.C. 621. The subject-matter of his brief 'prophecy' is the temporary desolation of Judæa ('I will utterly consume all things from off the land,' i. 2), on account of the infidelity and worldliness of the inhabitants, Jerusalem being specially assailed by the author for her filth and pollution, the tyranny and rapacity of her rulers, and the violence and treachery of her priests and prophets. At the same time the prophet predicts the destruction of the surrounding heathen nations, the Philistines, the Moabites, Ammonites, Ethiopia, and Assyria. The close, in which he declares that God will leave a righteous remnant in Israel, and for their sakes will ultimately bless the land with permanent peace, is couched in a strain of tender exultation.

## ZEPHYR—ZERRAHN.

**ZEPHYR**, n. *zěf'ēr*, or **ZEPH'YRUS**, n. -*ūs* [F. *zéphyr*, a zephyr—from L. *zephyrus*; Gr. *zephūros*, the western breeze—connected with Gr. *zophos*, the dark side, west]: the west wind; any soft, mild, gentle breeze; also a very fine light yarn or a fabric made of such yarn.

**ZERAFSHAN**, *zěr-āf-shān'*: river of Asia: see **BOKHARA**.

**ZERBST**, *tsěrpst*: town, cap. of the former duchy of Anhalt-Zerbst (see **ANHALT**); in the duchy of Anhalt, 10 m. n.w. of the town of Dessau; on a level sandy spot on a tributary of the Elbe. The Church of St. Nicholas is a beautiful specimen of Gothic architecture. Articles in gold and silver, silk, tobacco, sugar, and beer are manufactured. Handsome baths have been erected over a mineral spring.—Pop. (1880) 14,201; (1885) 15,069.

**ZER'DA**: see **FENNEC**.

**ZERIBA**, n. *zěr-ē'ba*, or **ZAREEBA**, n. *za-rē'ba* [Egypt. *zerebak*, a thorn hedge]: a word which came into use in 1884, during military operations in Egypt, to denote an inclosure the sides of which are formed of prickly brushwood, sheltered by which a force may camp comparatively safe from sudden surprise.

**ZERMATT**, *tsěr-măt'* or *zěr-*: village of Switzerland, in the canton Valais, on the left bank of the Gorner Visp, at the head of the Nikolai valley, 9 m. n.e. of the Matterhorn. The valley is one of the most magnificent in Switzerland, being shut in by the loftiest peaks of the Alps; and Z. with its great hotels is the central point of the tourist travel of the district.—Pop. (1888) 525.

**ZERO**, n. *zě'rō*, **ZEROS**, or **ZEROES**, n. plu. *zě'rōz* [F. *zéro*—from It. *zero*—from Arab. *sifr*, a cipher: the same word as **CIPHER**]: the neutral point between any ascending and descending scale or series, generally represented by the mark 0; the extreme point of depression; naught; nothing; the point of a graduated instr. at which its scale commences. In the thermometer and similar scales the zero is the line from which all the divisions are measured up or down, or in the positive and negative directions. In the Centigrade and Reaumur thermometers, Zero notes the freezing-point of water, measurements above the 0 or zero being distinguished as positive or +, while those reckoned downward from the 0 or zero are distinguished as negative or —. In the Fahrenheit scale (F.) in general use in the United States, the United Kingdom, and Brit. colonies, the zero is placed 32° below the freezing-point of water (see **THERMOMETER**). **ABSOLUTE ZERO OF TEMPERATURE**, the lowest possible temperature which the nature of heat admits of. This has been determined, and is 273.70 below the zero of the centigrade scale (see **THERMOMETER**).

**ZERRAHN**, *tsěr-rān'*, **CARL**: musician: b. Malchow, Germany, 1826, July 28. He studied music in Rostock, Hanover, and Berlin; and came to the United States 1848 with the Germania Musical Soc., which gave concerts in the principal cities of the country, with such artists as Jenny Lind, Madame Sontag, Ole Bull, Thalberg, and Camilla Urso. Z. has been musical director of the Handel



## ZEST—ZEULENRODA.

and Hayden Soc. of Boston since 1854; conductor of the Harvard Musical Assoc. 1866–82; conductor of the festivals of the Worcester Co. Musical Assoc. since 1865 (except 1868, when he was in Germany); and assisted in New York festivals 1869, 73. He has edited *The Index* and *The Apograph* (1885), for the use of musical organizations.

**ZEST**, n. *zĕst* [F. *zeste*, a piece of citron or lemon skin—from L. *schistus*; Gr. *schistos*, divided—from Gr. *schizō*, I divide]: something that gives a relish; taste added; relish; hence piquancy; gusto; hearty satisfaction: V. to heighten the taste or relish of. **ZEST'ING**, imp. **ZEST'ED**, pp.

**ZETA**, n. *zĕ'ta* [L. *zeta*, for *diæta*, a chamber, a dwelling—from Gr. *diæita*, a way of living, mode of life, a dwelling]: a little closet or chamber; applied by some writers to the room over the porch of a Christian church, where the sexton or porter resided, and kept the church documents.

**ZETETICS**, n. *zĕ-tĕt'ĭks*: a part of algebra which consists in the direct search after unknown quantities.

**ZETICULA**, n. *zĕ-tĭk'ŭ-lă* [dim. from L. *zeta*, a drawing-room, a summer-house]: a small withdrawing-room.

**ZET'LAND**: see **SHE'T'LAND**.

**ZEUGLODON**, *zŭ'glō-dŏn* (literally, 'yoke-tooth'): genus of fossil cetaceans or whale-like mammals, with long snout and yoke-like, double-rooted formation of some of the molar teeth (hence the name); and regarded by Huxley as intermediate between the true cetaceans and the carnivorous seals. The genus was originally named *Basilosaurus*, on the supposition that the creature was a saurian. The remains of Z. were found first in La., 1839; an almost complete specimen, 70 ft. long, was obtained 1843 in Ala. The vertebræ, of large size, were formerly so common in some places in the Gulf states as to be used in the manner of stone fences. A long string of them, mounted, was exhibited once in St. Louis as the remains of a gigantic serpent; but the fraud was soon exposed.

**ZEUGLODONTIDÆ**, n. plu. *zŭ-glō-dŏn'tĭ-dĕ* [Gr. *zeuglĕ*, the strap or loop of the yoke, of which the yoke had two; *odous* or *odonta*, a tooth]: family of extinct cetaceans in which the molar teeth are two-fanged (see **ZEUGLODON**).

**ZEUGMA**, n. *zŭg'ma* [Gr. *zeugma*, a band, a yoke—from Gr. *zeugnumi*, I yoke or link together]: a junction of words; a figure in grammar by which a verb or adjective is joined to two nouns though suitable to only one of them, but which suggests another verb or adjective suitable to the other noun. **ZEUGMATIC**, a. *zŭg-măt'ĭk*, of or pertaining to the figure zeugma.

**ZEULENRODA**, *tsoy-len-rŏ'da*: town of the German principality of Reuss-Greiz, 51 m. s.s.w. of Leipzig; on a high plateau, in a wooded hilly district. Z. is regularly built, with four suburbs. It has a spacious market-place, with a court-house, two churches, schools, and a hospital. There are bleach-works, a trade in cattle, and manufactures of woolen goods, especially hosiery.—Pop. 6,770.

## ZEUS.

ZEUS, *zūs* [Skr. *div*, light; *djaus*, heaven; *devas*, god: L. *Ju-piter* and *Dies-piter*, i.e., Father Zeus: AS. *Tiu*, whence Tuesday]: greatest of the national deities of Greece. According to the most received mythology, he was the son of Cronos and Rhea, brother of Poseidon and Hera, the latter of whom was also his wife. He expelled his father and the older dynasty of the Titans; assumed the sovereignty of the world, and successfully resisted the attacks of the giants and the conspiracies of the gods. In the allotment of the world, after the dethronement of the Titans, Z. gained the rule of heaven and air, Hades of the infernal regions, and Poseidon of the sea; while the earth was left subject to the influence of all three, though Z. was regarded as having the supremacy throughout all departments. Crete, Dodona, and Arcadia were the places where the worship of Z. was most cultivated; and though originally the inhabitants of these places may not have regarded themselves as worshippers of the same god, yet, in process of time, all the local gods revered under the name of Z. were at last merged in one great Hellenic divinity—a process carried further when he was identified with the Jupiter of the Romans and the Ammon of Libya: see JUPITER.

Besides the epithets of Z. from the seats of his worship, he had many titles from his various powers and functions, moral and physical. He was the father and king of gods and men; the protector of kings, of law and order; the avenger of broken oaths and of other offenses; he watched over the state, the assembly, the family, over strangers and suppliants; his hand wielded the lightnings and guided the stars; he ordained the changes of the seasons, and, in short, regulated the whole course of nature. All prophecy, too, was supposed to originate in him, and from him the prophetic god Phœbus received his oracular gift. He dispensed, as it pleased him, both weal and woe to mortals; but whether he could control the Fates themselves is a point about which the ancients disagreed. Of the many epithets applied to Z., perhaps the best known is the Olympian, from that Olympus in Thessaly whose summit was believed to be his residence as well as that of the other gods. His most celebrated festival was the Olympic, at Olympia, in Elis, after the end of every fourth year.

Combined with such exalted conceptions of the majesty and power of Z., we find many stories current respecting his amours with mortals and immortals: he is represented as acting with caprice, anger, deceit. Probably, in many cases, an ancient Greek of average position and capacity did not view such matters with any very strong disapprobation. Others, again, as Xenophanes (q.v.), protested against the transference to the gods of human passions and failings; or, as Pindar, maintained that they would believe nothing of the gods that was discreditable to them; or, as Euripides, argued that such tales were sufficient to disprove their divinity; or, as Euhemerus, held that the local worship of Z., like that of other deities, was owing to the fact that divine honors were paid to deified men at the place of their burial, and that of course it was no wonder to find



## ZEUXIS.

human actions assigned to gods who had once been human. In modern times the various myths were at one time explained as symbolical of various celestial and terrestrial phenomena, such as the apparent motion of the sun, the alternation of day and night, the changes of the seasons, and so forth. The most rational explanation is as follows: In early times men thought and spoke of natural objects as if they were personal agents, employing names for them which were literally, not symbolically, significant. But from lapse of time, and the departure of various tribes from their original seats, in many countries the meaning of these words became obscured, and though men still used them, their real significance was forgotten, and terms which originally had expressed some process of nature, were conceived to narrate some incident in the history of a person: e.g., the expression that the sun follows the dawn was misunderstood, and gave rise to the myth of Phœbus pursuing the nymph Daphne, because the word Daphne was no longer understood. Such misconceptions were then, by successive ages, elaborated into myths, more or less fanciful, and even revolting. In this respect Z. has fared no better, or rather much worse, than the other deities. In the same way as the Greek war-god Ares is a personage much inferior to the Latin Mars, so the serious and unimaginative Roman's conception of his majestic Jupiter Optimus Maximus (the best, the greatest) was more elevated than that conceived of Z. by the sensuous Greek. But this might be expected from the different character of the two peoples. Except in the grander attributes of omnipotence and fatherly care of the universe, we can trace little in common; for the Jupiter of the Latin poets, as portrayed in Virgil and Ovid, is drawn entirely from Greek sources.

ZEUXIS, *zûks'is*: Greek painter: about B.C. 420-390; b. Heraclea, probably the city of that name in Lucania. He is styled also Z. Ephesus, which means that he belonged to the Ionian school of painters. He was at Athens about the beginning of the Peloponnesian war. He excelled in the treatment of light and shade, in accuracy of imitation of natural objects, and in expressing the perfection of human, particularly female, beauty. This last he effected by selecting the finest models for each separate part. His most famous pictures were: *Zeus Enthroned, with the Gods Standing Round; Helen; The Infant Hercules Strangling the Serpents; The Female Hippocentaur*. By the exercise of his art, he attained to great riches and fame, and, like his rival Parrhassius, was exceedingly conscious of his pre-eminence. He repeatedly presented rather than sold pictures to cities that were anxious to possess them, because he thought no money-price could pay for them. Greece was plundered of many of his masterpieces by her Roman conquerors; and one of the noblest, the *Hippocentaur*, was lost on the passage to Rome. Designs on vases, sarcophagi, and other works of antiquity exist adorned with representations of the same subjects as Z. painted, and probably were imitated from his productions.

**ZEÿST**, *zēst*: large village in the Netherlands, province of Utrecht; surrounded by beautiful well-wooded estates and country-seats, the summer residences of many of the principal families of Amsterdam. The industries are making soap, candles, and vinegar, brass and zinc founding, etc. On a rising ground, and surrounded by fine old trees, stands the Dutch Reformed church, built 1180. There is also a Rom. Cath. church. In 1746 a soc. of Moravian Brethren settled at Z., where they have built a separate quarter, consisting of public and private buildings, erected along the sides of two large grassy squares, called the Easter Plain and the Wester. Besides the church, there is an excellent day and boarding school, resorted to by children of parents belonging to various Prot. communions. The unmarried members live, the males in the Brothers' House, the females in the Sisters' House. Another building is set apart for widows. There are also family residences, workshops, and warehouses.—Pop. of Z. (1870) 5,440; (1880) 5,815.

**ZHITOMIR'**: see **JITOMIR**.

**ZIEGA**, n. *zē'ga* [etym. doubt.]: curd produced from milk by adding acetic acid, and after rennet has ceased to cause coagulation.

**ZIERIKZEE**, *zē'rik-zā*: old and important town in the Netherlands, province of Zeeland; in the s.e. of the island of Schouwen. It was fortified before the beginning of the 11th c., and owed its rise and prosperity to the shipping-trade and fishing. The walls have been levelled, planted with trees, and formed into shady walks. Z. has two havens, the old and the new, two Dutch Reformed churches, a Lutheran, a Rom. Cath., a small dissenting church, and a Jewish synagogue. There are a grammar school, school of design, and other excellent public schools maintained by the town. The principal occupations are trade in agricultural produce, shipping, ship-building, fishing, weaving calicos, beer-brewing, drying madder, sawing wood, grinding corn, etc.

Z. suffered severely in the contests between Flanders and Holland for the possession of Zeeland. In 1303 the Flemings besieged it with a large army, but were compelled, by Count William of Holland, to retire 1304. In the long war of independence, after an obstinate defense, the Spaniards took Z. 1576.—Pop. (1870) 7,834; (1880) 7,139.

**ZIF**, or **ZIPH**, n. *zīf*, or **ZIV**, n. *zīv* [Heb. *ziv*—from *zachach*, to shine, to be beautiful—referring to the splendid appearance of the flowers during the month: or from Assyrian *Giv*, the Bull, the constellation Taurus]: the second month of the Hebrew year, beginning with the new moon of May; or according to some Rabbis the new moon of Apr. In some copies of the A. V. the spelling is Zif, in others Ziph; in the revised version Ziv, which is the correct form. Now known as *Iyar*.



## ZIGANKA—ZILLERTHAL.

**ZIGANKA**, n. *zīg-äng'ka* [Russ.]: a dance popular among the Russian peasantry; a country-dance.

**ZIGZAG**, a. *zīg'zäg* [an attempt to represent the thing signified by the voice: Ger. *zickzack*: F. *zigzag*: Sw. *sick-sack*]: having short sharp turns or angles: N. a sharp angular turn; something that has short turns or angles, as a line, the stem of a plant, etc.; in *mil.*, a trench of approach against a fortress, so constructed that the line of trench may not be enfiladed by the defenders (see **SIEGE**): in *arch.*, a Chevron (q.v.): V. to form into short turns or angles; to run or advance in sharp turns or angles. **ZIG ZAGGING**, imp. **ZIG'ZAGGED**, pp. *-zägd*.

**ZILLAH**, n. *zîl'lâ* [Ar.]: in *India*, a province or tract of country constituting the jurisdiction of a commissioner or circuit judge and the extent of a chief collectorate.

**ZILLEH**, *zîl'leh* (ancient *Zela*): town in Asiatic Turkey, pashalic of Sivas; about 30 m. w.s.w. of Tokat. It is on a height, with a small flat conical hill in the centre of the town, which is evidently the mound or road, of which another portion is still seen at Thyana, whose construction was attributed to Semiramis. Scarcely any remains of antiquity are visible; an ugly fortress of the middle ages having usurped the place of a beautiful temple. This was the field of Julius Cæsar's battle with Pharnaces, of which he wrote 'Veni, vidi, vici.' There are several large khans, and manufactures of coarse cottons. The annual fair, of 15 or 20 days, from the middle of Nov., is often frequented by 40,000 or 50,000 persons from the commercial towns of Asiatic Turkey. The pop. is almost entirely Turkish; and there are about 2,000 houses.

**ZILLERTHAL**, *tsîl'lér-tâl*: one of the principal valleys in the Tyrol, traversed by the Ziller; about 50 m. long. Toward the s. and s.w. it is bounded by lofty glaciers; but toward the n., where it opens into the valley of the Inn, it is fertile. Among the eight secondary valleys are the Duxerth—alfamous for its precipitous glaciers, 1,200 ft. high—and the Zemthal, both remarkable for several great waterfalls. The inhabitants of the Z., who number about 15,000, are celebrated even in the Tyrol for their handsome, well built figures; and their fine Alpine songs are well known and appreciated in London and Paris. The chief wealth of the Z. is from rearing cattle. About 5,000 head of cattle are exported yearly; but, notwithstanding, the valley is not able to support its numerous population. Many of the men hire themselves out as servants for the summer, while others go about as pedlers, selling essences of herbs, and gloves, of which 10,000 pairs are made yearly. The principal towns are Zell and Mairhofen. For some years the valley has been much visited by artists, chiefly from Munich.

In recent times, the inhabitants of Z. acquired notoriety by a part of them leaving the Rom. Cath. Church, and emigrating. For a considerable time they had been in the habit of reading the Bible, and were on friendly terms with the Prot. Church, though still attending the Rom. Cath.

service; but when, 1826, the Rom. Cath. clergy began to enforce auricular confession with greater strictness, a number of them thought seriously of going over to the Prot. Church. Ere long they not only objected to the confessional, but to the worship of the saints, absolutions, masses for the soul, purgatory, etc. In 1830 they began to leave the church; and by 1832 the number of dissenters had amounted to 240. Emperor Francis, to whom, on his visit to Innsbrück 1832, they addressed a petition regarding their religion, promised them toleration; but after considerable delay they were told (1834) that they must either return to the Rom. Cath. faith or remove to Transylvania, where there were Prot. congregations. As the Zillerthalers could not agree to this, they formed the resolution, as the Protestants of Salzburg had once done, of seeking a refuge in Prussia. This was granted; and the Zillerthalers, who had been allowed by the Austrian govt. to sell their property, set out, 1837, Aug., for Prussia. In all, 399 men, women, and children arrived, Oct. 2, at Schmiedeberg, in Silesia, where they were to stay until arrangements for their reception in Erdmannsdorf were completed. The king gave them 22,500 thalers (£3,375) on their settlement, and (1839) made them a further grant of 12,500 thalers (£1,875) for a church and school. The colony received the name of Z., and in 1871 numbered over 400 inhabitants.—See *Geschichte der Zillerthaler Protestanten* (Nürnb. 1838); Rheinwald, *Die Evangelischgesinnten in Zillerthal* (4 Aufl., Berl. 1838).

ZIMB, *zim* or *zimb*: dipterous insect of Abyssinia, exceedingly destructive to cattle, and related to the Tsetse (q.v.) of the more southern parts of Africa. It is supposed to be the *Zebub* of the Hebrew Scriptures (Is. vii. 18). Bruce describes it as very little larger than a bee, but



Zimb.

thicker in proportion; wings broader, and without color or spot; head large; upper lip sharp, having at the end of it a strong pointed hair, a quarter of an inch long; lower lip with two similar bristles. The flight of the insect resembles that of the gadfly, and is attended with a peculiar buzzing. The Z. is

found only where the soil consists of a rich black loam; but all the inhabitants of the sea-coast, along the s. shores of the Red Sea, and s. beyond Cape Guardafui, are compelled to remove their cattle in the rainy season to the nearest sands, in order to prevent their destruction by this pest, as well as those of more inland districts from the mountains of Abyssinia n. to the confluence of the Astaboras and the Nile. 'As soon as this plague appears, and their buzzing is heard,' Bruce says, 'all the cattle forsake their food, and run wildly about the plain till they die, worn out with fatigue, fright, and hunger.' The camel, the elephant, and the rhinoceros are liable to the attacks of the Z., as well as the ox; but the elephant and rhinoceros protect themselves by rolling in mud, which, when dry, coats them as a kind of armor.



## ZIMENT-WATER—ZIMMERMANN.

ZIMENT-WA'TER, n. *zim'ënt*- [Ger. *cementwasser*, cement or cementation water]: water formed in copper mines; water impregnated with copper.

ZIMMERMANN, *zim'er-man*, Ger. *tsim'mër-mán*, JOHANN GEORG, Ritter von: Swiss philosopher and physician: 1728, Dec. 8—1795, Oct. 7; b. Brugg, in the Swiss canton of Berne, in which his father was a senator. He was educated at home, in the first instance, and afterward at Berne, preparatory to his going to the Univ. of Göttingen to study medicine. This he did in 1747. By his countryman, the celebrated Haller, he was kindly welcomed; he became an inmate of his house, and had the advantage of his valuable aid in the prosecution of his studies, in which he aimed at a large and liberal culture, while attaining great proficiency in his specialty. He became public physician in Brugg, his native place, and speedily acquired such a reputation for skill as brought patients from a great distance to consult him. In 1756 he published a miscellany of prose and verse, remarkable as containing the first sketch of his treatise *On Solitude*, which afterward became famous. In 1758 appeared his work on *National Pride*; in 1763 his elaborate work on *Experience in Medicine* (*Von der Erfahrung in der Arzneikunst*; Zürich, 2 vols. 8vo), whose value was instantly recognized. Having accepted the post of physician to the king of Britain at Hanover, with the title of aulic councilor attached, Z. went to Hanover 1768. His repute as a physician continued to increase, and from all quarters came patients in crowds for his advice. In 1770 misfortunes began to thicken upon him: his wife died; an internal malady compelled him to undergo a perilous operation at Berlin; his only daughter died; and a son who survived sank under disease into idiocy. Z., who through life had struggled against a constitutional melancholy, became now a hypochondriac. From this he was rescued for a time by a second marriage, into which his friends persuaded him; and he gave to the world 1784 his celebrated work *On Solitude* (*Ueber die Einsamkeit*; Leipzig, 4 vols. 8vo), a book which speedily became a favorite throughout Europe. In 1786 he was invited by Frederick the Great, then in his last illness, to attend him at Potsdam; but found the case of the king beyond the reach of his art. He remained, however, for some time; and as the result of his sojourn, he published 1788 and 90 two works on Frederick the Great, the manifold indiscretions in which involved him in acrimonious controversy. These indiscretions seem to have been the first indications of a return of his constitutional malady in an aggravated, and, as it proved, a finally hopeless form. His melancholy hallucinations increased till at length his reason seemed utterly gone, and he died at Hanover. As a physician, a philosopher, a man of general accomplishment, and a writer of singular power and felicity, Z. was one of the most remarkable figures of his time.—See Z.'s *Eigene Lebensbeschreibung* (Autobiography, Han. 1791); Tissot, *Vie de Z.* (1797); Wichmann, Z.'s *Krankengeschichte* (1786); Bodemann, *J. G. Z.* (1878).

## ZINC.

**ZINC**, n. *zīngk* [F. *zinc*; Ger., Sw., and Dan. *zink*, zinc—perhaps from Ger. *zinn*, tin]: an elementary body, forming a light metal of a bluish-white color, harder than lead, and much used as a substitute for it in the arts, in architecture, etc., in the form of plates, rolled sheets, and leaves; alloyed with copper it forms *brass*; spelter: V. to coat or cover with zinc. **ZINC'KING**, imp. *-king*: N. process by which iron is coated with zinc. **ZINCKED**, pp. *zīngkt*: ADJ. coated with zinc. **ZINC-WORKER**, one who manufactures articles out of sheet and plate zinc, such as rain-pipes, water-runs, and roof-ridges. **ZINC'DE**, n. *zīng'kōd* [Gr. *hodos*, a way]: the positive pole of a galvanic battery. **ZIN'COID**, a. *-koyd* [Gr. *eidos*, appearance]: like zinc; applied to the zincous plate in connection with a copper-plate in a voltaic circle, to note the positive pole. **ZIN'COUS**, a. *-kūs*, of or pertaining to zinc; pertaining to the positive pole of a galvanic battery. **ZINC'KY**, a. *-kī*, pertaining to or resembling zinc. **ZINCIFEROUS**, a. *zīngk-īf'ēr-ūs* [L. *fero*, I bear]: containing or yielding zinc. **ZINCITE**, n. *zīngk'īt*, a native oxide of zinc, found at Franklin Furnace, Sussex co., New Jersey; red oxide of zinc or spartalite. **ZINCOGRAPHY**, n. *zīng-kōg'ra-fī* [*zinc*, and Gr. *graphō*, I write]: the art of drawing upon and printing from plates of zinc. **ZINCOG'RAPHER**, n. *-fēr*, an engraver on zinc-plates. **ZINCOUS ELEMENT**, the basic or positive element of a binary compound. **ZINC-WHITE**, oxide of zinc, used as a pigment in the place of white-lead. **ZINC-VITRIOL**, sulphate of zinc.

**ZINC** (symb. Zn, at. wt. 65; sp. gr. 6·8 to 7·8): a hard bluish-white metal, lustrous externally, which, when broken, exhibits a foliaceous crystalline fracture. At ordinary temperatures it is somewhat brittle; but when heated to 248° to 302° F. it becomes perfectly ductile and malleable, and may be drawn into wire or rolled, without danger of fracture, into thin plates, retaining its malleability when cold. At about 410° F. it again becomes so brittle that it may be easily pulverized. It fuses at 773°, and at a white heat may be volatilized; and if the vapor be exposed to the air, it burns very brilliantly, and is converted into oxide of zinc, which is deposited in copious white flakes. The temperature of its boiling-point is estimated by Deville at 1,904° F. On exposure to the air, Z. soon loses its metallic lustre, and assumes a gray appearance, in consequence of its surface becoming oxidized, while the metal beneath is thus protected from further change—a property which renders this metal especially useful for many economical purposes, as in roofing, and as a coating of sheet iron for roofing and other purposes, and for coating telegraph and other wires: see **GALVANIZED IRON**. It has no action on water at ordinary temperatures, but if a mineral acid be present, it readily decomposes water, and is employed to decompose the water of dilute sulphuric acid, when hydrogen is required. Moreover, a hot solution of potash acts on Z., hydrogen being liberated, while oxide of Z. is formed and dissolved in the alkaline solution. Z. precipitates from their solutions most of the



## ZINC.

electro-positive or basylous metals less oxidizable than itself.

This metal is never found in the native state. In its commercial state it is commonly called Spelter (q. v.). That obtained by the ordinary methods of extraction usually contains a small quantity of lead, iron, and carbon, with occasional traces of arsenic and copper. To obtain it in a chemically pure state, a stream of sulphuretted hydrogen is passed through a slightly acidulated solution of sulphate of zinc, and after removal of any precipitate that may be found, the solution is boiled to expel the gas, after which the Z. is precipitated in the form of carbonate, by the addition of carbonate of soda. The carbonate is converted by ignition into oxide of Z., which must be distilled in a porcelain retort with the purest available form of carbon, e. g., charcoal prepared from loaf-sugar.

Z. is commonly regarded as forming only one compound with oxygen—namely, *protoxide of zinc* ( $\text{ZnO}$ ), though it has been suggested that the film formed on the surface of metallic Z. by exposure is a sub-oxide. Protoxide of Z. is obtained by heating the metal in the air. The white oxide thus obtained was known formerly as *Lana philosophica*, from its woolly appearance, and in pharmacy as *Flores zinci*, or *Flowers of Zinc*. The process of manufacturing this oxide, when it is required as a pigment, consists in distilling Z. from clay retorts into chambers through which a current of air is maintained. The volatilized metal burns at the high temperature to which it is exposed under these circumstances; and the oxide is deposited in a series of condensing chambers. The pigment thus obtained is known as *Zinc White*. The impure oxide of Z., commonly known as *Tutty*, is obtained from the flues of furnaces in which brass is melted. A hydrated oxide of Z. ( $\text{ZnOH}$ ) is precipitated in a white gelatinous mass from the solution of the salts of Z. by addition of potash or soda, but redissolves in an excess of the alkali. Oxide of Z. is readily soluble in acids, and is capable of being reduced by charcoal, but not by hydrogen. The most important salts formed by oxide of Z. are the sulphate and carbonate. *Sulphate of Zinc*, or *White Vitriol* ( $\text{ZnSO}_4, 7\text{H}_2\text{O}$ ), occurs in large transparent, glistening, four-sided prismatic crystals, resembling those of Epsom salts. At a temperature a little below  $212^\circ \text{F}$ . the crystals lose six atoms of their water of crystallization, and at a very much greater heat (about  $500^\circ \text{F}$ .) they lose the 7th atom, and previously to losing their water of crystallization, they fuse in it. This salt is readily soluble in water, requiring  $2\frac{1}{2}$  parts of the latter for its solution at  $60^\circ$ . It is obtained in considerable quantity as a residue in the process of obtaining hydrogen from dilute sulphuric acid and Z.; and it is prepared on the large scale by roasting and lixiviating zinc-blende or sulphide of Z., which, when heated in the presence of air, is oxidized into the sulphate. *Carbonate of Zinc* ( $\text{ZnCO}_3$ ), or zinc-spar, constitutes one of the most important of the zinc ores. Normal carbonate of Z. has never been artificially prepared, but a basic carbonate, having the composition

## ZINC

expressed by the formula  $2(\text{ZnO}, \text{CO}_2)$ ,  $3(\text{ZnO}, \text{HO})$ , may be prepared by precipitating a salt of oxide of Z. with carbonate of soda, when the required salt falls as a white precipitate. Of the haloid salts, the *Chloride of Zinc* ( $\text{ZnCl}_2$ ), known formerly as *Butter of Zinc*, is the only one requiring notice. This salt is obtained in the anhydrous form by burning Z. in chlorine gas, and in the hydrated state by dissolving Z. in hydrochloric acid, and evaporating the solution, chloride of Z. being thus formed, while hydrogen escapes in the gaseous form. In the anhydrous state, it forms a whitish-gray, semi-transparent mass, which fuses readily, and sublimes at a high temperature. When exposed to the air, it soon deliquesces, and is soluble in water in all proportions. The watery solution has a burning and nauseous taste, and in a concentrated state acts as a powerful caustic. It may be crystallized with 1 equivalent of water from its aqueous solution; and it is soluble in alcohol. It forms double salts with the chlorides of sodium, potassium, and ammonium; and a concentrated solution of the double chloride of Z. and ammonium ( $\text{H}_4\text{NCl} + \text{ZnCl}_2$ ) is much used for removing the film of oxide from the surface of metals, such as zinc, iron, or copper, which are to be united by the operation of soldering. With sulphur, Z. forms only one combination—viz., *sulphide of zinc*, or *blende* ( $\text{ZnS}$ ), one of the most abundant of the Z. minerals. Blende, when pure, is of pale brown color, but it is commonly blackish from admixture with sulphide of iron. It occurs usually crystallized in rhombic dodecahedra, or allied forms, but sometimes is found in the massive state. Sulphide of Z. may be obtained artificially as a white precipitate, which, on drying, becomes yellow, by addition of sulphide of ammonium to a solution of a zinc-salt. Z. forms several important alloys, among which *brass* (consisting of 2 parts of copper to 1 of zinc), *Muntz's metal* (consisting of 3 parts of copper and 2 of zinc [see YELLOW METAL]), and *German Silver* (q.v.) are specially notable. Prof. Miller sums up the characters of the salts of Z. as follows: 'The salts of zinc are colorless; their solutions have an astringent, metallic taste, and act rapidly as emetics. They are distinguished by giving no precipitate in acid solutions with *sulphuretted hydrogen*, but they yield a white hydrated sulphide of zinc with sulphide of ammonium.'

*Manufacture.*—That the Romans were acquainted with the art of making brass—an alloy of copper and Z.—is proved by the analysis of some of their coins struck soon after the Christian era. Yet Z. itself was not known in Europe as a distinct metal until Paracelsus in the 16th c. described its distinctive properties. Probably the Roman brass was produced by smelting ores containing both Z. and copper, some of which are at the present day smelted in Sweden. Z., however, was brought from the East by the Portuguese long before it became an article of commerce in Europe, and is supposed to have been known and made into articles of use and ornament both in India and in China from an early period.



## ZINC.

There are several ores of Z., but only two of much importance—blende and calamine. Zinc sulphate, or white vitriol, is sometimes found, in rhombic prisms, and results from the decomposition of zinc-blende; and the other Z. compounds are numerous. Blende, black-jack, or sulphuret of Z., contains, when pure, about 67 per cent. of Z., but, like most ores, it is rarely found pure. The usual composition of English blende is Z. 61, iron 4, and sulphur 33. It occurs in all the older geological formations, and is often associated with the ores of copper and tin, but most frequently with lead ore—occurring, of course, like these, in veins. Blende crystallizes in the form of the rhomboidal dodecahedron. The crystals have considerable brilliancy, but their lustre is waxy rather than metallic. It is usually of dark color, from the sulphuret of iron which it contains—hence the miners' name of *black-jack*. Sometimes it is sufficiently argentiferous for profitable extraction of the silver. Blende is found in Wales, Isle of Man, Cornwall, and Derbyshire. It is also found in a good many localities on the European continent—Sweden, in particular, being rich in this ore.

The name calamine has hitherto been used indiscriminately for both the anhydrous carbonate of Z. ( $\text{ZnCO}_3$ ), properly called Smithsonite, and the hydrous silicate of Z. ( $\text{ZnSiO}_3$ ), which resemble each other in physical properties. It is now usual to restrict the name to the silicate. Calamine varies much in the proportion of metal which it contains, on account of impurities. Its primitive crystalline form is the rhombohedron, but calamine as well as blende occurs more frequently massive than in crystals. It is usually of either dull-yellow or reddish-brown color. Like some other useful substances, calamine was formerly exported from England as ballast, through ignorance of its value. Belgium, Silesia, and Carinthia are well-known European continental localities; recently extensive deposits were discovered on the n. coast of Spain, which are estimated to last for ages; and the island of Sardinia is an important source. It occurs abundantly in the lead regions in the neighborhood of the upper Mississippi and the lower Missouri rivers, where it was formerly thrown aside as 'rotten stone.' The chief deposits worked are in Tenn., Ark., and (with blende) in the s.w. parts of Mo. and Wis., and also in Lehigh co., Penn., all, or mostly, in Silurian rocks.

Red oxide of Z. is found in N. J., where it is smelted. This is the protoxide ( $\text{ZnO}$ ) with a small quantity of oxide of manganese, which gives it its red color. Willemitite, or electric calamine, is another ore, generally associated, when found, with calamine. It is smelted in the United States, and yields very pure zinc. Franklinite, named from its locality in N. J., is a compound of Z., iron, and manganese oxides. The mining in the United States is chiefly by the Lehigh Zinc Co., the N. J. Co. at Franklin, N. J., the Passaic Co., with mines at Ogdensburg, N. J., and the n.w. companies; and the smelting-works best known are near Jersey City and at Bergen Point, N. J.; and, in the w., at La Salle, Ill., at Cherokee, Kan., and St. Louis,

## ZINC.

Mo. A white variety of zinc-blende occurs at Franklin, N. J. Hydrozincite, or zinc-bloom, usually earthy, sometimes stalactitic, is found in most mines of Z.; a cupreous variety in Lancaster, Penn. Zinkenite is a lead and antimony sulphide. Smithsonite ( $\text{ZnCO}_3$ ) and calamine can be distinguished by the former effervescing with acids.

According to reports of the census of 1890, the total of zinc ores mined the year preceding in the states e. of the Rocky Mts. was 234,503 short tons, valued at \$3,049,799. By states the tons mined were: Mo. 93,131; Penn. and N. J. 63,339; Kan. 39,575; Wis. 24,832; Tenn. and Va. 12,906; Io. 450; N. Mex. 140; Ark. 130. The production of metal and of oxide are united, except in Wis., where the latter only is carried on; and the N. J. works are mostly confined to this. Of the oxide, 21 establishments produced 16,970 short tons and 58,860 of spelter (metal), the production of the latter having risen from 23,239 tons (1880) and from 7,343 (1873). The most of the spelter, viz., about 75,000 tons in 1901, was used for galvanizing iron sheets and wire, and for brass manufacture. The total capital invested in the spelter and oxide industries was nearly \$5,000,000.

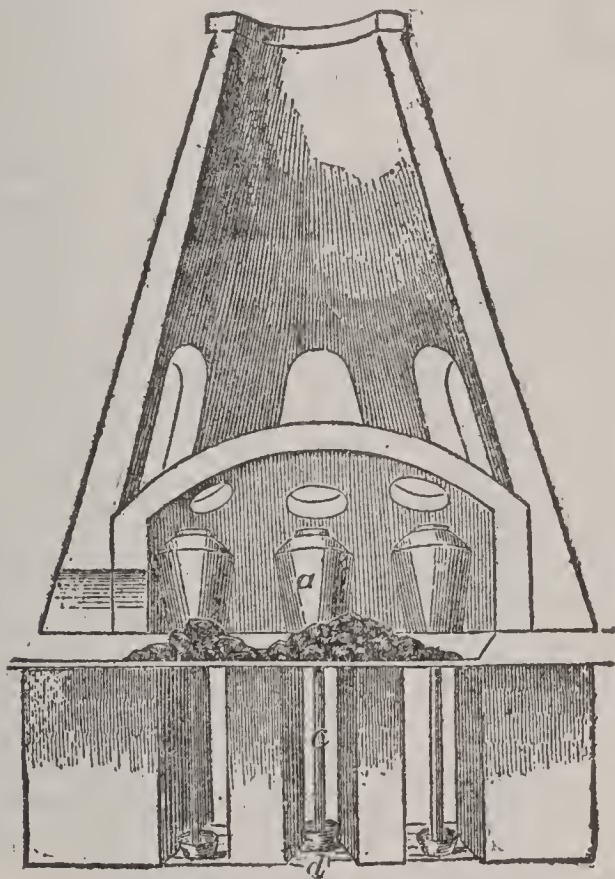


Fig. 1.

There are several distinct processes for extraction of Z. from its ores; and of these the English, the Belgian, and the Silesian are most important. The English process is as follows: The Z. ore (blende or calamine) is crushed between rollers to the size of hazel-nuts, and then roasted for about 12 hours, with occasional stirring, in a calcining



furnace. The furnace in which the roasted ore is reduced resembles a glass-furnace. It is either circular or octagonal in form, and usually contains six pots or crucibles of fire-clay, about 3 ft. high by  $2\frac{1}{4}$  ft. in widest diameter. In the bottom of each pot is an opening, from which a sheet-iron tube, in two pieces, descends about 8 ft., and under its open end there is a sheet-iron vessel to receive the condensed zinc. Fig. 1 gives a sectional view of this furnace, and fig. 2 a view of one of the pots with its appendages on a larger scale. Z., being volatile at high temperatures, is smelted by distillation, and in the English process it is called distillation *per descensum*. An entire charge—that is, a charge for the whole six pots (*a*)—consists of one ton of calcined ore mixed with a proper quantity of ground coke. When the pots are charged, their covers are fixed and luted on, the conical portion of the descending pipe (*b*) being previously securely fixed and lined with fire-clay. The hole in the bottom of the pot is plugged with wood, which becomes converted into charcoal by the heat, and is then sufficiently porous to allow the zinc vapor to pass down, while it stops the descent of the coke or ore. The heat of the furnace is gradually raised, and soon produces

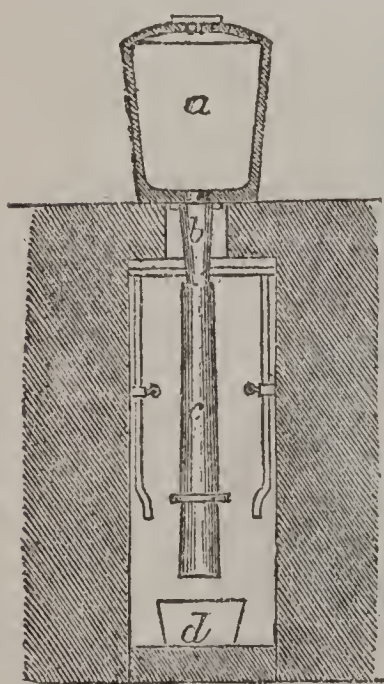


Fig. 2.

vapor of Z. in the pots, which condenses as it descends the pipes (*c*), and drops into trays (*d*) placed at the bottom of each pipe. Sometimes a tube becomes stopped by a lump of Z., and when this happens, the furnace-man melts it with a bar of red-hot iron. It takes nearly three days to work off the above charge, which yields about 8 cwts. of Z., and requires about 25 tons of coal for its distillation. It is necessary to watch the pots with great care while the process is going on, as any leakage usually causes much loss of Z. The *rough zinc*, as it is called, is removed from the pans, where it accumulates in lumps, and melted in cast-iron pots. It is then well stirred and skimmed, and finally cast into ingots or cakes of the ordinary commercial size—the

the skimmings being worked over again with a new charge of ore.

The Belgian furnace differs greatly in its construction from the English. It consists of 60 to 80 small fire-clay retorts, *a, a, a*, each about 3 ft. 6 in. long, by 8 in. in diameter, and set in a series of rectangular compartments, filling up an arched chamber. Fig. 3 shows a transverse section of this furnace. There is a clay nozzle or condenser, *b, b, b*, attached to the front of each retort, and on the end of this nozzle is a sheet-iron receiver, *c, c, c*, for the condensed Z. The fireplace is shown at *d*, and *e* is the pit to collect

## ZINC.

the residue from the retorts. The retorts are charged with ground and roasted calamine mixed with small-coal free from sulphur. As the upper retorts receive less heat than the lower ones, they are not so heavily charged, and they are supplied with less pure ores. At the end of every six hours the receivers are emptied of their melted zinc. In this process a ton of ore can be smelted in 24 hours, and the yield from it is about 40 per cent. of metallic zinc.

In the Silesian furnace, fire-clay retorts, about 4 ft. long by 1 ft. 6 in. in diameter are arranged in two-rows, back to back, and placed horizontally on a flat furnace-bed, with a fireplace on a lower level along between the backs of the retorts. A condensing apparatus comes away with a curve from the upper part of the front of each retort, and descends about 2 ft. below it. From this the Z., on condensing, drops on the ground, or into a tray placed to receive it.

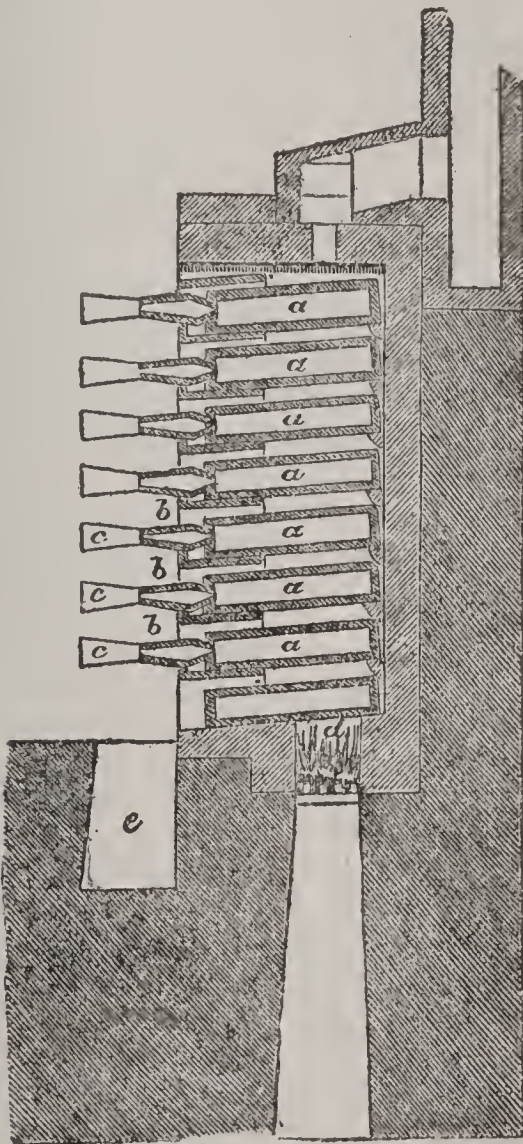


Fig. 3.

As to the comparative merits of these three processes of smelting Z., no very decided opinion appears to be yet arrived at by those who have the best means of judging. The Belgian process consumes the least fuel, but requires the greatest labor; the English is worked with the



## ZINC.

least labor, but requires the most fuel; while the Silesian holds a sort of middle position. Each, however, has minor advantages and disadvantages which the others have not, and all three are in use.

Z. at ordinary temperatures is a comparatively brittle metal; but about the beginning of the 19th c. it was discovered that, if heated to between  $200^{\circ}$  and  $300^{\circ}$  F., its malleability and ductility were so increased that it could be rolled with facility into thin sheets, or drawn into fine wire. Since this was known, the uses of the metal, which formerly was employed only with copper to make brass, have become greatly extended. In sheets it is used for roofing, baths, water-tanks, spouting, and the like; also for covering ships' bottoms instead of copper. A considerable quantity is consumed for name-plates, for engraving upon, and for galvanic batteries. Perforated sheets with various ornamental patterns are manufactured for screens, blinds, light fences, and similar objects. As a material for casting artistic works, Z. has the desirable properties of having a low melting-point, and of taking a sharp impression from the mold, so as to require but little labor from the chaser; it has also considerable hardness. It has, in consequence, become a favorite material for making casts of statues, statuettes, and different kinds of ornaments.

The total amount of spelter produced in the United States 1891 was 76,500 tons, an increase of 10,158 tons over 1890. In 1901 the production of spelter in the United States was 142,822 short tons, the largest output in its history. Illinois, Indiana, Kansas, and Missouri were the chief producing states.

*Medical Uses.*—In its purely metallic state, Z. produces no effect on the animal economy, but several of its compounds are very active medicines. As a matter of convenience, we consider these compounds alphabetically. *Acetate of Zinc*, is a salt obtained by dissolving, with the aid of heat, carbonate of Z. in a mixture of acetic acid and distilled water, filtering the liquid while hot, and setting it aside to crystallize. In this process, the carbonic acid of the carbonate of Z. is displaced by the acetic acid and escapes with effervescence. The salt is obtained in thin, translucent, and colorless crystalline plates of pearly lustre, with sharp unpleasant taste, soluble in water, from which it may be precipitated, pure white, by sulphuretted hydrogen, and evolves acetic acid when decomposed by sulphuric acid. The crystals contain 3 equivalents of water, and their composition is represented by the formula  $\text{ZnO}, \text{C}_4\text{H}_2\text{O}_3, 3\text{H}_2\text{O}$ . Acetate of Z. is not much employed internally, but is one of the most valuable local astringents, and is useful (in the form of solution of 3 to 5 grains in an ounce of water) especially in the treatment of skin diseases attended with much discharge, such as eczema, impetigo, etc., when the first inflammatory symptoms have subsided; and it is a useful astringent in the milder form of ophthalmia. It was the active ingredient in Sir Astley Cooper's celebrated injection for gonorrhœa.

in the third week—six grains of sulphate of Z. mixed with four fluid ounces of dilute solution of subacetate of lead, when sulphate of lead is precipitated, and acetate of Z. is held in solution. When employed as an ointment in skin diseases, 4 to 10 grains finely powdered may be rubbed up with cold-cream or simple ointment. *Carbonate of Zinc* is obtained for pharmaceutical purposes by decomposition of sulphate of Z. in solution and carbonate of soda, when the carbonate of Z. is precipitated as a white, tasteless, inodorous powder, insoluble in water, but soluble with effervescence and without residue in dilute sulphuric acid. This preparation has been introduced as a substitute for *native calamine*, which formerly had high reputation, but was so frequently adulterated as to render an officinal salt of known composition very desirable. Either in powder or in the form of ointment, it forms an excellent astringent application for treatment of intertrigo (or chafing of the skin), excoriations, and chronic skin diseases attended with much discharge. *Turner's Cerate*, though not in the Pharmacopœia, is in general use as a drying and healing ointment, and is one of the most popular remedies for superficial burns and sores. It is made by taking prepared calamine (or carbonate of Z.) and wax,  $7\frac{1}{2}$  ounces of each, and olive-oil, 1 pint. Melt the wax, and mix the oil with it, then remove them from the fire, and when the mixture begins to thicken, add the calamine, and stir constantly till they cool. *Chloride of Zinc*, in the form of colorless opaque rods, obtained by pouring the concentrated solution into proper molds, is used in surgery as a powerful caustic in cases of cancer, fungous growths, etc. In toothache caused by caries, a minute portion of chloride of zinc introduced into the cavity of the tooth after the removal of the diseased parts, affords almost immediate relief. In consequence of its powerfully destructive properties, it should never be applied except by the surgeon. The solution of this salt, commonly known as *Burnett's Disinfectant Fluid*, is of much use in the sick-room or hospital ward as a deodorizing agent; as, however, it possesses strong caustic properties, great care must be taken that it is not administered internally in mistake for some other medicine. Few years pass without several fatal cases of this kind being recorded. *Oxide of Zinc* is characterized in the Pharmacopœia as 'a soft, white, tasteless, and inodorous powder, becoming pale yellow when heated, and forming with diluted sulphuric acid a solution which gives a white precipitate with hydrosulphide of ammonia.' It is employed internally with much success as a tonic in chorea and epilepsy, in which it must be given for a considerable period, and in gradually increasing doses till a scruple is taken daily. In doses of one or two grains combined with extract of henbane, it forms an admirable night-pill to check the perspiration in pulmonary consumption. Employed externally, in the form either of powder or of ointment, it is a good astringent in cases of excoriation, sore nipples, intertrigo, slight ulcerations, etc. The officinal ointment, containing 80 grains to an ounce of



## ZINCOGRAPHY.

simple ointment, is too strong for ordinary cases, and is apt to *cake* on the surface: these defects may, however, be removed by addition of glycerine. *Sulphate of Zinc* is employed as an astringent, a caustic, an emetic, and a tonic. As an astringent, it is given internally in small doses (half a grain to two grains, made into a pill with conserve of roses) in cases of chronic diarrhea, chronic bronchitis, and long-standing leucorrhea; while it is used topically as a lotion in old ulcers (5 to 20 grains to an ounce of water), as a collyrium in chronic ophthalmia, and as an injection in the abortive treatment of gonorrhea (i.e., when it is wished to cut short the disease before inflammatory symptoms appear). As a caustic, this salt, in its anhydrous state, and finely levigated, was strongly recommended by Sir James Simpson, who applied it in the form of powder; of a paste made with glycerine in the proportion of a dram of the latter to an ounce of the powder; or of an ointment consisting of two drams of prepared lard, rubbed up with an ounce of the powder. It has also been successfully used in the Dublin hospitals. Sulphate of Z. may be given in the same doses as the oxide as a tonic in cases of nervous palsy, and in the exhaustion resulting from sexual excesses. In large doses, as 15 to 30 grains, it operates as a safe and speedy emetic, and is preferable to all other emetics in cases of poisoning.

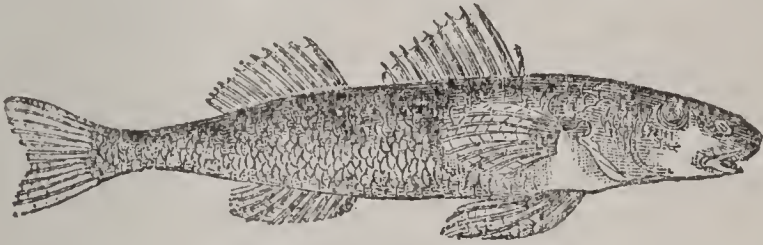
ZINCOGRAPHY, *zǐng-kǒg'ra-fǐ*: the art of printing from zinc-plates on which a design in writing has been etched in relief by the action of a dilute acid. The process is as follows: A plate of zinc finely polished is prepared, and if an original drawing is to be copied, it is done by the artist in lithographic crayon on this plate; autographic writing done with the crayon, lithographs, and fresh proofs of wood or copper-plate engravings, must be transferred in the usual way to the surface of the plate; and while still wet, an ink-roller is passed over, to give a deeper impression. Rosin very finely powdered is then sifted over, which adheres to the wet ink, and becomes consolidated, so that the superfluous powder is easily brushed off from the parts not covered with ink. The plate is next placed with its face upward in a shallow trough containing dilute sulphuric or hydrochloric acid sufficient to slightly cover it; the trough is then gently rocked, to make the acid flow forward and backward over the plate, and if this be continued some time—an hour or more—all the parts of the plate not covered with the ink and rosin are etched deep enough to be used as a relief-plate for printing from. In impressions where there are large interspaces, it is usual to saw them out; and in some cases, where it is found that the relief is not sufficiently high, the raised parts are re-inked, and again covered with the rosin, and submitted a second time to the action of the acid. By the aid of photolithography (see PHOTOGRAPHY), ordinary pen-and-ink drawings on paper or card-board, and ordinarily printed copies of engravings of any kind, may be reproduced by this process. One great advantage of this method is that the original drawing may be made as large as convenient,

## ZINGARO—ZINNIA.

and reduced to the required size when photographed. By this means a much finer result can be obtained than would be possible if the drawing had to be executed of the exact size required. A slight pressure will then easily produce a copy on the polished zinc-plate, which is perfected by the subsequent operations.

ZINGARO, n. *zǐng'gâ-rô*, ZINGARI, n. plu. *zǐng'gâ-rê* [It.]: a gypsy.

ZINGEL, *zǐng'el*: a fish of the genus *Aspro* and family *Percidæ* (the perches), remarkable for the elongated form of the body, and for having the mouth situated under the projecting and rounded snout, also for the roughness of their scales. The dorsal fins are widely separated, and the ventral fins are large. Only two species of *Aspro* are known: of which one, the Z. of the Danube (*A. zingel*),



Zingel (*Aspro vulgaris*).

attains a length of 15 in. and a weight of 2 or 3 lbs.; the other (*A. vulgaris*), 6 or 7 in. long, is found in the Rhone and its tributaries, also in more e. rivers of Europe. Both are esteemed for the table.

ZINGIAN, a. *zǐn'jǐ-an* [etym. doubt.]: in *philol.*, a name sometimes given to the s. African family of languages; called also Bantu and Chuana. A peculiarity of this family is the use of clucks or clicks in speaking.

ZINGIBERA'CEÆ: see SCITAMINEÆ.

ZINNIA, *zǐn'nǐ-a*: genus of annual plants, of the order *Compositæ*, natives of warmer parts of America, and much cultivated for ornament. In nature only the outer or 'ray' florets of the head of flowers are petal-like; but since about 1856 very many cultivated double varieties have been produced, resembling in the form of the heads the most perfect dahlias, and of all colors, white, orange, scarlet, etc. The so-called zebra zinnias have the same head striped or blotched with different hues of crimson or rose, pink, violet, yellow, white, etc. The improved dwarf varieties have flowers of great size. The 'pigmy Mexican,' only 5-7 in. high, bears on each plant a hundred or more flowers of intense orange, and may be used as a border plant. The 'double Pompone' has conical heads. There is also a trailing variety. A small-flowered yellow species (*Z. pauciflora*) of Peru has been long known in cultivation. *Z. elegans* of Mexico, with natively purple flowers, has clasping heart-shaped leaves. *Z. grandiflora*, with narrow leaves, occurs in the Rocky Mountains; and the red *Z. multiflora* has run wild in the s. states. Zinnias, being annuals, are grown from the seed. The generic name is from a German botanist, J. G. Zinn.



## ZINZENDORF.

**ZINZENDORF**, *zîn'zên-dorf*, Ger. *tsîn'tsên-dorf*. **NICOLAUS LUDWIG**, Count von ZINZENDORF AND POTTENDORF: religious reformer, founder of the existing sect of the Moravian Brethren (q.v.) or Herrnhuters: 1700, May 26—1760, May 9; b. Dresden; descended from an ancient family in Lower Austria, which had taken the Prot. side in the Reformation. His father, a Saxon state minister, died while Z. was a child, and Z. was educated by his grandmother, a learned and pious lady, Baroness von Gersdorf. Spener, the head of the Pietists, was a frequent visitor at her house, and his conversation, and the devotional exercises in which Z. took part, influenced his character while a mere child. In 1710 he went to Halle, where he spent six years, under the special care of Francke, the philanthropist. Z. founded among his fellow-pupils a religious society, to which he gave the name 'Order of the Grain of Mustard-seed.' In 1716 he was sent by his relatives to Wittenberg, where Pietism was in less repute than at Halle; but he adhered to his early religious impressions. Two years afterward, he travelled through Holland and France, everywhere endeavoring to convert the distinguished persons whom he met to his own religious views. On his return to Dresden, he was appointed a member of the Saxon state council, and married the sister of the Count Reuss von Ebersdorf. At court he openly confessed Christ, and kept his life pure. But political life was little to his mind, and he returned to his country-seat in Upper Lusatia, having resolved to settle down as a Christian landowner, spending his life among and in behalf of his tenantry. He intended to develop practically the Pietist ideas of Spener (q.v.: see also PIETISM). His aim was not to found a new church separate from the national Lutheranism; but rather to stir the torpid orthodoxy of the established church by the influence of an active association devoted to itinerant evangelical preaching, tract-distribution, religious correspondence, education, and practical benevolence. At his country-seat, Berthelsdorf, he accidentally met a wandering carpenter, Christian David, a member of the old sect of Moravian Brethren, of whom some still remained in Moravia, professing the doctrines taught by John Huss. David described the persecutions to which the sect were exposed; and Z. invited him and his friends to settle on his estate. They accepted the proposal, and the colony received the name 'Herrnhut.' Z. acted with great liberality to the settlers, and their success attracted much attention. In 1734 Z. went under a feigned name to Stralsund to pass an examination in theology, and was ordained a minister of the Lutheran Church. In 1736 he was banished from Saxony, on a charge of introducing dangerous novelties in religion; but this aided to extend his influence. In 1749 the Saxon govt. rescinded this decree, and requested him to establish other settlements of Moravians, like Herrnhut. He repaired to Holland, where he founded a Moravian colony, and afterward to Esthonia and Livonia, where also he founded colonies. In 1737, at

the request of King Frederick-William I. of Prussia, Z. was ordained bp. of the Moravians. In the same year he went to London, where he was received with much consideration by Wesley. In 1741 he went to N. America, accompanied by his daughter, and founded the celebrated Moravian colony of Bethlehem, Penn. The Herrnhuters, in the meanwhile, by their good conduct and industry had won the respect of all classes in Saxony, and in 1747 Z. was allowed to return to Herrnhut. Having received authority by act of the Brit. parliament to establish Moravian settlements in the English colonies of N. America, he returned thither to do so. He finally settled at Herrnhut; and, his first wife being dead, married Anne Nitschmann, one of the earliest colonists from Moravia.—Z. was author of more than 100 works in verse and prose. Selections of his hymns are used in worship by the Moravians: some of his poetry is objectionable as giving too sensuous expression to pious feelings. The same may be said of his sermons, especially of those which refer to the Holy Ghost as a spiritual mother. His writings are often incoherent or mystical, but they abound with passages containing deep and original thought.—Z. was a man of mighty faith. While he disliked the stiff Lutheran orthodoxy, he saw the shallowness of the rationalism which was attacking it; and made it his work to point men to the personal historical Christ as the supreme manifestation of the Father in heaven. His natural ardor sometimes led him to press his doctrinal statements beyond scriptural limits, and to decide questions on an appeal to his feelings, and to act with a zeal whose force was like fire; but he had a splendid nobleness of character, a great love for his fellow-men, a readiness for self-sacrifice in doing good, a high conception of the Christian calling, and a devoted affection for the personal Lord Jesus, which mark him as one of the princes in the kingdom of God on earth. His great estate was nearly all expended in a work which was his delight—the founding and maintaining the Moravian Brethren as ‘a little church within a church.’—There are Lives of Z. by Spangenberg (1775), Varnhagen von Ense (in his *Biographische Denkmale*, 1830), and Burkhardt (1876); also many others.

ZION, n. *zī'ōn*: hill in Jerusalem, which was the royal residence of King David and his successors; hence, *figuratively*, the Church of God. Mount Zion was in the s.w. part of Jerusalem, and on it stood the City of David, or Upper City, with the citadel of David. At the present day only the n. half belongs to the city, the city wall running obliquely over the hill. On the w., and still more on the s. side, it descends steeply into the vale of Hinnom, 300 ft. below. Mount Z. is 2,537 ft. above the Mediterranean Sea. With the prophets and poets of the Old Test. Z. often stands for the whole of Jerusalem (also called ‘Daughter of Zion’), particularly in reference to the Temple. See JERUSALEM.

ZIPPEITE, n. *zīp'pē-īt* [after *Zippe*, a Bohemian mineralogist]: a variety of uranic ochre or hydrated sulphate of urania.



## ZIRCON—ZIRCONIUM.

**ZIRCON**, n. *zér'kõn* [Cingalese]: a heavy, hard, sparkling mineral ( $\text{SiO}_2\text{ZrO}_2$ ), more or less transparent, found colorless and of various colors—yellow, brown, red. Colorless varieties are often sold as diamonds. The reddish-orange variety is sometimes called *hyacinth* by jewellers. Zircon is slightly harder than quartz. In Ceylon the pale or smoky variety is called *jargon*. **ZIRCONIA**, n. *zér-kõ'nĩ-ă*, a white tasteless powder ( $\text{ZrO}_2$ ) obtained from zircon, which acts both as a base and as an acid. **ZIRCONITE**, n. *zér'kõn-ĩt*, a grayish or reddish-brown and nearly opaque variety of zircon. **ZIRCONIA LIGHT**, intensely bright light produced by the action of oxygen and a highly sulphuretted gas on zircon cones, instead of on the lime bells used in producing oxyhydrogen or lime light. Zirconia, or oxide of zirconium, when highly heated emits a very strong light, and its resistance to disintegration even after prolonged ignition makes it preferable to lime in the oxyhydrogen light. A burner was some time ago devised by Linnemann expressly for the use of zirconia; but it had certain defects: it has since been very much improved by Wölz, of Bonn, and the new form is said to be well adapted for its purpose. In such burners the oxygen must be supplied at sufficient pressure to cause combustion of the mixed gases (oxygen and coal-gas or hydrogen) to take place as they issue from the burner, 0·5—1·0 centimetre (about 0·19—0·39 in.) above its mouth, in order to obtain a conical flame of the highest intensity which shall not cause the burner to be overheated. This pressure of the oxygen is about 15 times that of the coal-gas. Large burners have not proved economical in practice, because the large central stream of oxygen that issues from them does not mix rapidly and thoroughly enough with the issuing stream of coal-gas; and complete immediate consumption of the gases is the essential condition of success. This imperfection can readily be detected when one observes the flame through smoked glass: then the point at which unconsumed oxygen impinges on the incandescent zirconia is seen as a black spot.

The best zirconia cones are made as pure as possible, and molded into cylinders 2 centimetres (about 0·79 in.) long and 0·8 centimetres (about 0·31 in.) diameter. When heated with 30 litres (litre = 61 cubic in.) of oxygen per hour and the same amount of coal-gas, they yield a light equivalent to 40–50 candles. With equal expenditure of coal-gas the ordinary gas-burner produces less than  $\frac{1}{40}$  as much light as the oxyhydrogen zirconia light.

**ZIRCONIUM**, *zér-kõ'nĩ-ũm* (symb. Zr, at. wt. 90): the metallic constituent of the earth *zirconia*, which is found in association with silica in the precious minerals *zircon* and *hyacinth*; also in eudialyte, fergusonite, and several other compounds. It was first isolated by Berzelius 1824, and has little lustre when burnished. In crystals it resembles antimony. Commonly it is obtained as a black powder. The sources from which Z. is derived are few; its compounds are found in Ceylon, the Ural, s. Norway, and the United States—e.g., fergusonite in Mass. and N. Carolina.

**ZIRKNITZ** (or **CZIRKNITZ**), *tsirk'nīts*, LAKE (Ger. *Czirk-nitzersee*, *Lacus Lugeus* of Strabo): small lake of Austria, in Carniola, about 20 m. s.s.w. of Laibach, 30 m. e.n.e. of Trieste; in a deep valley s. of Mt. Javornik, and n.e. of Mt. Slivinja. The lake is about 5 m. long, and between 2 and 3 broad, is surrounded with numerous villages, chapels, and castles, contains four small islands—on the largest of which is built the hamlet of Ottok—and has no surface outlet. It is about 56 ft. deep in the deepest part, and is very irregular in shape. It is notable only for the remarkable phenomenon of the occasional disappearance of its waters for several weeks, and even months, during which the bottom is often covered with luxuriant herbage, which the peasants make into hay; sometimes also they manage even to sow and reap a small crop of buckwheat in its deserted bed. The waters, however, are not perfectly regular in their disappearance—indeed, sometimes for five or six years together they have not retired at all—but usually they drain off in the end of Aug., and return, if the season be wet, in five or six weeks. It takes between 20 and 25 days to empty the lake, but the return of the waters is sudden and unexpected, its basin being refilled sometimes in 24 hours. The phenomenon is accounted for by the nature of the bed of the lake, which is of limestone, and, like all the Carniolaic plateau, is full of deep fissures and caverns, through which the waters disappear at irregular intervals, returning when the rain sets in. Some of these openings are 50 ft. deep, and the chief ones are known to the peasantry by particular names. They communicate with subterranean reservoirs, penetrating the interior of the surrounding mountains, through which the waters are replenished or drawn off. There are 12 of these openings which discharge water into the lake as well as draw it off, and 28 which draw it off only. Through the former of these the water pours in after rainy weather as from a spout. When the surface of the lake reaches the caverns of Velka-Karlanza and Malka-Karlanza, the waters are discharged by these into the valley of St. Canzian, and, after disappearing several times, fall into the Unz, above Planina. Sometimes, however, the volume of water is so great that these caverns prove insufficient to carry it off, when the lake overflows and covers the neighboring country, sometimes submerging villages. In 1834, Jan., the lake was drained, and remained perfectly dry till 1835, Feb.—an occurrence without parallel in its history. The lake is stocked with fish, and at certain times is the resort of great numbers of waterfowl.—There is a small village of Z. on a small stream that falls into the n. side of the lake.

**ZISKA**, *zís'ká* (or **ZIZ'KA**), JOHN, of Trocznov: famous leader of the Hussites: about 1360–1424, Oct. 11; b. Trocznov, in the circle of Budweis, Bohemia; of noble descent. He became a page to King Wenceslas of Bohemia, but his thoughtful temperament unfitted him, while a mere boy, for the frivolous occupations about court; so, entering on the career of arms, he served as a volunteer in the English army in France, and afterward was in the dreadful bat-



tle of Grünwald, near Tannenberg (in which the grand master and 40,000 knights, it is said, were left dead on the field). In the war Z. had lost his right eye; though the assertion that he was called Z. on this account is a mistake, as Ziska does not in either Bohemian or Polish mean 'one eyed,' and his family had borne the name for generations. His restless spirit led him to join the Austrians against the Turks, and subsequently the English against the French; and returning to Bohemia soon after the murder of John Huss (q.v.), he became chamberlain to King Wenceslas. Z. was an adherent of the Hussite doctrine; and the tragical fate of its apostle, with the tyrannical cruelties exercised by the imperial and papal officers on its adherents, excited in his mind the liveliest indignation and resentment. A similar sentiment, originating as much from patriotic as from religious feelings, pervaded the kingdom; and a powerful party was soon formed, which urged on the king a policy of resistance to the decisions of the Council of Constance. Z. soon became prominent among the leaders of this party, and his personal influence with the king gained for it the latter's sanction to offer resistance, though the king's vacillating disposition incapacitated him from giving effect to his own honest convictions, and taking open part with his subjects against their oppressors. After the outbreak at Prague (1419, July 30), in which the violent behavior of the Rom. Catholics was avenged by the precipitation of 13 magistrates from the Council windows, Z. was unanimously chosen leader of the Hussites, and the first great religious conflict of Germany began in earnest. The shock produced by news of this outbreak was fatal to Wenceslas; and his death gave more of a political character to the contest, as when his brother, Emperor Sigismund (the same who had allowed his safe-conduct to Huss to be violated), attempted, by advancing an army of 40,000 men into the country, to obtain the throne, his project was frustrated for a time by the Hussites, who insisted on their religious and political liberties being secured, and totally defeated his army with a hastily levied force of not more than 4,000. On the retirement of the imperialists, Z. completed his conquest of Bohemia by the capture of the castle of Prague 1421 (the town had been taken in the spring of 1420), and secured his hold of the country by erecting fortresses, chief of which was that of Tabor, whence his party derived its name *Taborites* (q.v.). The varied experience acquired by Z. in foreign warfare was now of immense service to his party; his followers were armed with small firearms (then little known); and his almost total deficiency in cavalry was compensated for by the introduction of the *Wagenburg* (or 'cart-fort,' constructed of the baggage-wagons), to protect his little army from the charges of the mail-clad knights. Numerous other inventions and ingenious contrivances mark Z.'s brief career as leader of the Hussites, and show his eminent qualities as an engineer and a general. In 1421 he lost his remaining eye at the siege of the castle of Rabi; but though now totally blind, he continued to lead his troops to a succession of victories almost unexampled in history—

## ZITHER.

the list of 13 pitched battles fought by him, always with much inferior force, including only one defeat, and that so much resembling a drawn battle, that his opponents dared not molest his retreat. His greatest achievements were the rout (1422, Jan. 18) of Sigismund's second invading army, which was driven into Moravia, and 2,000 men of it drowned in attempting to escape across the frozen Iglau; and his great victory at Aussig, over the German crusading army, commanded by Frederick the Warlike of Saxony and the Elector of Brandenburg. In the latter conflict the furious onset of Z.'s troops was steadily sustained by the Saxons, who were choice troops, and the fanatic Hussites recoiled in astonishment at a successful resistance which they had never before encountered. Z., apprised of the situation, approached on his cart, thanked his men for their past services, adding, 'and if you have now done your utmost, let us retire.' Thus stimulated, they made a second charge still more furious than before, broke the Saxon array, and left 9,000 of it dead on the field. Sigismund became convinced that the conquest of Bohemia was impossible, and after a time proposed an arrangement with the Hussites, by which full religious liberty was allowed; and Z., who had an interview with the emperor on the footing of an independent chief, was to be appointed gov. of Bohemia and her dependencies. But the war-worn chief did not live long enough to complete the treaty, for, while besieging the castle of Przibislav, he was seized with the plague, and died. He was buried in a church at Czaslav, and his iron war-club was hung up over his tomb. A foolish story was long current that, in accordance with Z.'s express injunctions, his skin was flayed off, tanned, and used as a cover for a drum, which was afterward employed in the Hussite army; in order that even when dead he might be a terror to his enemies.

The only accusation which can with justice be made against Z. is on the ground of cruelty, the victims being the monks and priests who fell into his hands. But it was an age when inhumanity was general; and most atrocious cruelties were without hesitation or scruple practiced on the Hussites, and it was not to be expected that the weaker party should set the example of moderation.

ZITHER, n. *zith'ér*, or ZITH'ERN, n. *-érn* [from same root as CITHERN, which see]: a stringed musical instrument having 28 and sometimes 31 strings.—The *Zither* or cithern is the modern representative of the ancient *cithara*, and is a popular and common instrument in Tyrol (q.v.). It is a flat stringed instrument, having a wooden frame and flat sounding-board, with brass strings. When to be used it is placed on a table or on the knees, and the strings are played by the right hand, the thumb being armed with a metallic *plectrum* to bring out the melody more prominently.



## ZITTAU—ZOAN.

**ZITTAU**, *tsit'tow*: town of Saxony, 48 m. e.s.e. of Dresden (69 by railway); near the Bohemian frontier. The town has many churches, the most notable the Byzantine Church of St. John, finished 1836; a splendid court-house, one of the finest in Saxony; a good library of 12,000 vols.; a gymnasium, a normal, a free, an industrial, a Rom. Cath., and other schools; a work-house, infirmary, asylum for orphans, etc. Z. is the centre of the linen and damask manufacture of Saxony. There are also woolen manufactures, bleach-fields, dye-works, paper, oil, and saw mills, and iron-foundries. Its position on the railway into Bohemia led the Prussians to make it a centre of operations in the war of 1866. Pop. (1880) 22,473; (1900) 30,921.

**ZLATOUST**, *zlá-tóst'*, or **KLIUCHI**, (Golden Mouth): town of Russia, govt. of Ufa, among the Ural Mountains, about 150 m. n.e. of Ufa, on the river Ufa. It consists chiefly of wooden houses, and the inhabitants are mostly miners. It is the centre of the iron and gold mines of the district. There is an extensive manufactory of sword-blades, considered the best in the empire; other articles of inlaid and embossed steel are manufactured.—Pop. (1884) 19,000; (1891) 21,105.

**ZMEINOGORSK**, *zmā-nō-gorsk'*, or **ZMIEF**, *zmē-ěf'*: town of Siberia, in a mountainous dist. of the govt. of Tomsk, more than 350 m. s.w. of the town of Tomsk, on the river Smievka. The town is in the vicinity of one of the most productive silver mines in Siberia, discovered 1736, crown property since 1745. Since its discovery it has yielded nearly half of all the silver produced by the Siberian mines.—Pop. 5,990.

**ZNAIM**, or **ZNAYM**, *znīm* or *tsnīm*: town of the Austrian Empire, in Moravia, on a rising ground close to the left bank of the Taja, 45 m. n.-by-w. from Vienna. It is notable for the conflict between the French and the Austrians 1809, June 14, in which the French were victorious (see **WAGRAM**). A castle on a height, ancient residence of the princes of Moravia, is now a military hospital. Pop. about 12,000, chiefly of German origin.

**ZOAN**, *zō'an*: ancient city of Egypt, on the delta of the Nile, 25 m. from the sea, 40 m. w. of Pelusium. It was the Avaris of the Egyptian historian Manetho, and was called Tanis by the Greeks and Romans. The present name is San. It is mentioned in the Old Test. as built seven years after Hebron. Probably it was rebuilt by the 'shepherd kings,' who made it their capital for about 500 years, B.C. 2000 to 1500, or somewhat earlier. A recently discovered inscription renders it probable that the city was the residence of the Pharaoh of the book of Exodus, and thus harmonizes with Psalm lxxiii.—'Marvellous things did he in the sight of their fathers, in the land of Egypt, in the field of Zoan.' By Strabo it is spoken of as a large city, about B.C. 24, though it began to decline 600 years before. Josephus, about A.D. 80, however, speaks of it as small. The ruins of the city, occupying three-quarters of a sq. m., are 1 m. e. of the present village, and

## ZOANTHROPY—ZOAR.

buried under mounds. The French explorer Mariette (q.v.) made extensive excavations, identifying the site as that of the Hyksos capital, uncovering the remains of a great temple of granite and many large obelisks, and accumulating many treasures for the Egyptian museum at Boolak. The 'Canopus Stone' was discovered there 1865, and, like the Rosetta Stone, found 1799, has an inscription in three languages—the hieroglyphic, the cursive Egyptian, and Greek. The name Zoan occurs in the prophecies of Isaiah, in which rebukes of it are uttered; and the desolation of the city was predicted by Ezekiel. It is said that the villagers of San still show the Semitic features derived from the Arabic or Canaanitish invaders under the shepherd kings.

**ZOANTHROPY**, n. *zō-ăn'thro-pī* [prefix *zo-*; Gr. *anthrōpos*, a man]: in *pathol.*, a kind of monomania in which the patient believes himself transformed into one of the lower animals. Lycanthropy (q.v.) comes under this head.

**ZOAR**, *zō'ár*: village in Ohio, 90 m. e.n.e. of Columbus, settled 1817, by a German community, 'The Society of Separatists of Z.,' who hold in common 9,000 acres of land; they have a woollen factory, mills, a store, church, school, and other social and industrial establishments, all managed by trustees, elected by popular vote.—Pop. about 400.

**ZOAR**, *zō'ér*: the one of the five 'cities of the plain' which was not destroyed in the catastrophe that fell on the others, Sodom, Gomorrah, Admah, and Zeboim. As appears from Gen. xiv., the name of the city was Bela, but it was changed to Zoar (Gen. xix.), signifying 'little,' in reference to Lot's request, 'Behold now, this city is near to flee unto, and it is a little one'—in consequence of which request it was spared. Its probable destruction at some time subsequently accounts for Hebrew traditions that all the five cities were overwhelmed. Many suppositions have been entertained as to the location of the cities. Until in comparatively recent times it was believed that the site was at or near the southern end of the Dead Sea, perhaps covered by the shallow waters there. Objections to this view are that (Gen. xiii.) it was visible from Bethel, and was in the plain of Jordan; also that it was visible to Abraham from 'his place' Hebron, and to Moses, who from Pisgah saw 'the plain of the valley of Jericho, the city of palm trees, unto Zoar.' Smith's Bible Dictionary assigns the site to the n. end of the Dead Sea, and Selah Merrill believed that he had found some remains of the city there. One of these ruins has an un-Arabic name resembling a Hebrew word that means 'little.' As to the natural means employed for the catastrophe, the plain is described in the Bible as one of great fertility before the event, and after it a land of brimstone and salt and burning: brimstone and fire were rained upon it, and the morning after the destruction smoke went up as the smoke of a furnace. Large quantities of asphaltum were thrown up from the Dead Sea in the earthquakes of 1834 and 37. See SODOM: DEAD SEA.



## ZOBÔ—ZODIAC.

**ZOBÔ**, *zô'bô*: hybrid between the Yak (q.v.) and the common ox of India; common in w. parts of the Himalaya, and valued as a beast of burden, as well as for its milk and its flesh.

**ZOCLE**, *zô'kl*, or **SOCLE**, *sô'kl*: in architecture, square plain plinth under the base of a column.

**ZODIAC**, n. *zô'di-ăk* [F. *zodiaque*—from Gr. *zôdiakôs*, the zodiac—from *zôdiôn*, a little animal, because the signs of the zodiac are represented principally by the figures of animals—from *zôôn*, an animal]: an imaginary broad belt in the heavens, extending about  $8^\circ$  on each side of the ecliptic, within which the apparent motions of the sun, moon, and the most conspicuous of the planets, being those known to the ancients, are confined—divided into 12 parts, called *signs of the zodiac*. **ZODIACAL**, a. *zô-dî'a-kal*, relating to the zodiac.—The *Zodiac* was fixed at about  $16^\circ$  in width, for the purpose of comprehending the paths of the sun and of the five planets (Mercury, Venus, Mars, Jupiter, and Saturn) which were then known; and as Mercury among all these has by far the greatest inclination of orbit to the ecliptic, and the value of that element in his case is only  $7^\circ 0' 9''$ , the width given to the Z. was amply sufficient for the required purpose. But when Ceres, Pallas, and Juno were discovered in the beginning of the 19th c., the idea which had been long seated in men's minds, that no planets existed beyond the limits of the Z., was rudely shaken, for it was found that planets did exist which exhibited orbits inclined to the ecliptic at no less angles than  $10^\circ 36\frac{1}{2}'$ ,  $34^\circ 42\frac{3}{4}'$ , and  $13^\circ 3\frac{1}{2}'$ ; and the large number since observed have been found to wander from  $0^\circ$  to  $18^\circ$  beyond the Z., from which fact they with the three above mentioned have been denominated *ultra-zodiacal* planets. The stars in the Z. were grouped into 12 constellations, to each of which  $30^\circ$ , or  $\frac{1}{12}$  of the whole circle, was assigned, though it often did not fill up that space, but was only situated in it; and this equable division into *signs* was of great advantage in defining the positions of the sun and planets at any epoch.

The constellations, with the appropriate symbols of the corresponding signs, are as follows:

- |                              |  |
|------------------------------|--|
| 1. Aries ( <i>Ram</i> ) ♈    | 7. Libra ( <i>Balance</i> ) ♎          |
| 2. Taurus ( <i>Bull</i> ) ♉  | 8. Scorpio ( <i>Scorpion</i> ) ♏       |
| 3. Gemini ( <i>Twins</i> ) ♊ | 9. Sagittarius ( <i>Archer</i> ) ♐     |
| 4. Cancer ( <i>Crab</i> ) ♋  | 10. Capricornus ( <i>Goat</i> ) ♑      |
| 5. Leo ( <i>Lion</i> ) ♌     | 11. Aquarius ( <i>Water-bearer</i> ) ♒ |
| 6. Virgo ( <i>Virgin</i> ) ♍ | 12. Pisces ( <i>Fishes</i> ) ♓         |

As one half of the ecliptic is to the n., and the other to the s. of the equator, the line of intersection of their planes is a diameter of each, and the two points in which this line meets the celestial sphere are known as the equinoctial points. The comparative immobility, with respect to the ecliptic, of these points, suggested at once the employment of one or other of them as a point from which to reckon; accordingly that point at which the sun crosses the equinoctial from s. to n. was fixed on, and called the first point (or commencement) of Aries. After the sun had advanced

eastward through this sign—i.e.,  $30^\circ$  along the ecliptic—he entered the sign of Taurus, continuing his course onward through the others in the order in which they are given above, again crossing the equinoctial southward at the point where he emerged from Virgo and entered Libra. This was the case with the sun during the time of Hipparchus (q.v.); but though the equinoctial points move very slowly, yet they do so with great uniformity, and the westerly motion of  $50''$  annually which they describe along the ecliptic has at the present time separated the sign Aries from the constellation Aries, and caused the former to correspond almost to the constellation Pisces. This gradual retrogression of the signs through the constellations of the Z. will continue till they accomplish, in about 25,868 years, a complete circuit; after which period the sign and constellation of Aries will coincide, as they did in the time of Hipparchus. Neither the Z. nor its constellations are of much use now in astronomy, except that its constellations, like the others, afford an easy though somewhat fantastic nomenclature for the stars, and a rude but sometimes convenient mode of reference to their positions.

The porticoes of the temples of Denderah and Esne, in Egypt, have representations of the zodiacal constellations, which are of great antiquity and have formed a fruitful theme of discussion. Dupuis, in his *Origine des Cultes*, has, from a careful investigation of the position of these signs, and calculating precession at its usual rate (see PRECESSION OF THE EQUINOXES), arrived at the conclusion that the earliest of them dates from B.C. 4000. This conclusion is controverted by Fourier, in his *Recherches sur les Sciences, etc., de l'Egypte*, who makes the representations at Esne 1,800 years older than the other. That these representations are of late origin has been established by finding on them the cartouches of Tiberius and Nero. The Greeks seem to have borrowed their constellations from the Egyptians and Babylonians, and this is corroborated, to some extent, by occasional remarks in Greek writers as to the positions of various constellations at certain times, which positions are inconsistent with the supposition of the observer being in Greece. The zodiacal figures of the Hindus, ancient Persians, Chinese, and Japanese have such remarkable resemblance to those of the Egyptians that there can be little doubt as to their common origin.

ZODIACAL LIGHT, *zō-dī'a-kal*: a luminous elongated triangular tract of the sky, lying nearly in the ecliptic, seen after sunset or before sunrise, at all seasons of the year in low latitudes, but rarely in our latitude, except in Apr. and May in the evenings, and six months later in the mornings. It is due probably to illuminated (partly, perhaps, self-luminous) matter, perhaps meteoric bodies, surrounding the sun in a very flat, lenticular form, nearly coinciding with the plane of the ecliptic, or rather with the sun's equator, and extending to a distance from the sun greater than that of the earth, since its apex is often seen more than  $90^\circ$  from the sun. It seems to have been distinctly pointed out first by Cassini, and was long re-



## ZOEPRAXISCOPE—ZOETROPE.

garded as the sun's *atmosphere*. This idea, however, is totally irreconcilable with mechanical principles; since, to assume so flat a form, in spite of the enormous attraction of the sun and its own elasticity, an atmosphere would have to revolve with a velocity so great as to dissipate it into space. The only conceivable explanation of the phenomenon is, therefore, in supposing it to consist (like the rings of Saturn) of an immense assemblage of small cosmical masses, rocks, stones, and pieces of metal, such as are continually encountering the earth in the form of aerolites or meteorites. For the dynamical stability of such a system, it is necessary only that each fragment should separately describe its elliptic orbit about the sun. The mutual perturbations of the system, on account of the enormous mass of the sun, would be exceedingly small, except in the case of actual collision; but some of the planets would have considerable effect on it. That this is the true explanation of the phenomenon is now generally believed. Some very curious recent observations on the Aug. and Nov. meteorites of 1866 have been considered to show that these bodies move in orbits almost exactly the same as those of two known comets. The comet, then, is merely that portion of the ring of small masses, all revolving nearly in the same orbit, where the greatest number are, for the time, collected; and it is possible that to the collisions, which must most frequently occur where the separate particles are most numerously grouped, are due the spectral phenomena of incandescent gases which have been observed in the heads of comets by Huggins and others. Such speculations, were this the place to pursue them, might easily be extended to the sudden production, and changes of form, of the tails of comets which occur near perihelion, for there the separate masses must necessarily be much more crowded together, and their impacts must be increased both in number and violence.

**ZOEPRAXISCOPE**, n. *zō-ě-prāks'ī-skōp* [Gr. *zōē*, life; *praxis*, action, exercise; *skopeō*, I see]: a Zoögyroscope (q.v.).

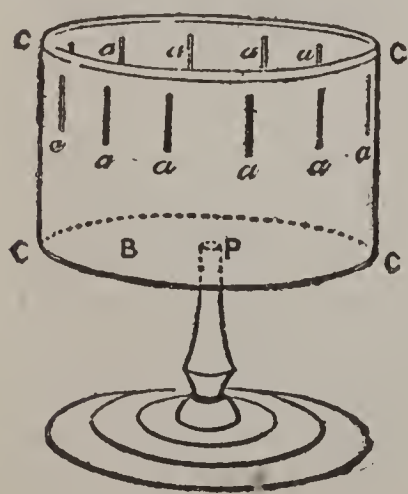


Fig. 1.

**ZOETROPE**, *zō'ē-trōp* ('wheel of life'): optical instrument, named from its exhibiting pictures of objects as if endowed with life and activity. It is simply a cylindrical thaumatrope; was invented by Desvignes, and patented, though not under the recent name of zoetrope, 1860. The marvellous results shown in this instrument depend, primarily, on the well-known fact that vision 'persists' for a very short interval of time after the occlusion of the visual ray. It follows from this principle, that, if a series of pictures, representing the different attitudes suc-

cessively assumed by an object in completing a given movement, be presented to the eye so quickly that the visual impression of each picture shall continue until the incidence of the one next following, the object will remain constantly in view, and its various parts will appear to execute the movement delineated by the pictures. The mechanical means for effecting this result are shown in fig. 1, which represents the zoetrope in its most popular, though not its best, form. C is a cylinder of strong card-board, 12 in. in diameter and  $7\frac{3}{4}$  in. in depth, with a metal rim at the top, and fastened to a circular piece of wood, B: the latter is screwed at its centre to a pivot, P, which moves freely within the upright of the stand, S, and forms a vertical axis, round which the cylinder revolves;  $\alpha$  indicates 13 equidistant apertures, each  $\frac{3}{16}$  inch in width and 3 in. long. Each

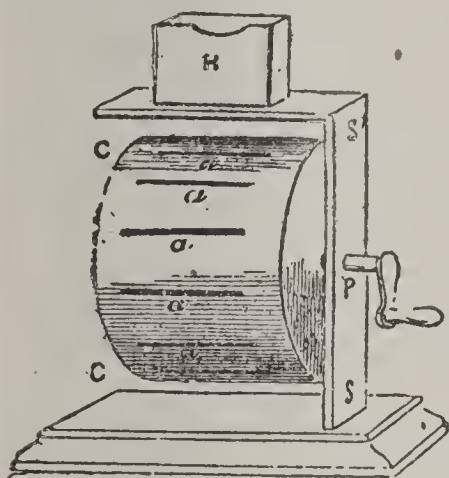


Fig. 2.

series of pictures is printed on a strip of thick paper,  $3\frac{1}{2}$  in. wide and 36 in. long. Illuminate the zoetrope well from above, and, having placed the picture-strip within the cylinder, immediately beneath the apertures,  $\alpha$ , rotate the cylinder with the requisite velocity (which will vary according to the nature of the subject), and look through the apertures at the pictures on the opposite side of the cylinder. A modified form is shown in fig. 2, in which the cylinder, C, turns on a horizontal axis, P; and by means of an aperture at the bottom of the hood, H, the sight is limited to the space occupied by a single group on the opposite side of the cylinder. In this arrangement the groups are arranged, on the strips, one above another, and not side by side, as in the former. The successive positions of a horse's leg in trotting or galloping may now be taken in a series of instantaneous photographs; such a series will, by means of the zoetrope, perfectly and beautifully show the action of the horse in motion. The width of the apertures should never exceed one-sixteenth of an inch.

ZO'HAR, or So'HAR: see CABBALA.

ZOILUS, *zō'ī-lūs*: grammarian: b. at Amphipolis. Authorities vary respecting the age in which he lived, and the manner of his death. The usual account is that he lived in the time of Ptolemy Philadelphus, who reigned B.C. 285-247: and that he solicited, but without success, the patronage of that monarch. He gained notoriety for the bitterness with which he attacked Homer, whence he was surnamed *Homeromastix*, Homer's Scourge. His name is used proverbially for a malignant critic. All his works are lost.



## ZOISITE—ZOLLVEREIN.

**ZOISITE**, n. *zoy'sīt* [named after Baron von Zois]: a variety of epidote of a brownish color.

**ZOLA**, *zō'la*, Fr. *zo-lá'*, **ÉMILE**: French novelist and dramatist: b. Paris, 1840, Apr. 2; son of an Italian engineer who constructed the Zola canal at Aix in Provence. Having completed his studies at the Lyceum of St. Louis in Paris, he obtained an appointment in the house of the publishers Hachette, and soon attracted notice by his contributions to the newspaper press. In 1865 appeared his *Contes à Ninon*, which was well received, and was followed by the *Confession de Claude*. In 1871 he began a series of novels under the general title *Les Rougon-Macquart*, designed to be the natural and moral history of a family under the second empire. *L'Assommoir* (1877), only in name one of this series, had great and immediate success; but was eclipsed by *Nana* (1880), of which 55,000 copies were sold on the day of publication, and 116,000 before the end of 1882. This work and *Pot Bouille* (1882) illustrate the so-called *naturalism* of the author. The predilection shown for discussing the more unlovely aspects of life—this animalism, as it has not unfairly been called—Z. defended on the score that his work was a scientific study of nature, and the moral exposure of vice. In 1898 he was tried on a charge of defamation in connection with the Dreyfus case, and sentenced to be imprisoned, but escaped punishment by voluntary exile in England. He died 1902, Sept. 29.

**ZOLLNER**, *tsöl'nér*, **KARL FRIEDRICH**: German composer of popular song-music: 1800, Mar. 17—1860, Sep. 25; b. in the village of Mittelhausen, Weimar, where his father was chorister. At 14 years of age he entered the Thomas-school in Leipzig, and developed much musical talent, and then applied himself to theology in the univ. While a student in 1820 he held the position of singing teacher in the public free school. In 1822 he abandoned theology for the science of music, which he taught in various schools, lastly in the Thomas-school. His quartette-songs, such as *Miller-songs* and *The Gypsy*, made his name popular. After his death in Leipzig, the various singing societies formed themselves into a Zöllner Union (Zöllnerbund), and in 1868 erected a monument to him in Rosenthal, near Leipzig.

**ZOLLVEREIN**, n. *zöl'fēr-în* [Ger. *zoll*, duty; *verein*, union, coalition]: a customs-union; specifically, an agreement or union of different independent German states, under the leadership of Prussia, enabling them, in their commercial relations with other countries, to act as one state. When, after the war of liberation 1815, the political union, destroyed by the downfall of 'the holy Roman empire,' had been restored to a certain degree in the German 'Bund' (see GERMANY), internal commerce was felt to be trammelled and depressed by the collection of revenue at the frontiers of every petty state; nor was it possible, without united action, to carry out the policy in regard to foreign commerce which might be thought best for protecting and developing the native trade and manufactures. The

first suggestion of such a union came from Prussia; but it took many years before an actual beginning was made, and still longer before it reached its ultimate extent, as the plan was opposed for a long time by the jealousies and special interests of many of the states.

From 1819 to 1828 only some of the minor principalities inclosed within the Prussian territories had been brought to conform to the Prussian commercial system; but 1828 Hesse-Darmstadt, and 1831 Hesse-Cassel, gave in. This was followed 1833 by the accession of Bavaria, Würtemberg, the kingdom of Saxony, the principality of the same name, Schwarzburg, and Reuss; and 1835-6 by that of Baden, Nassau, and Frankfurt-on-the-Main. The adhesion of Hanover did not take place till 1851, of Oldenburg till 1852. When, 1868, Lübeck and the two duchies of Mecklenburg had joined the Z., its territory extended over the whole of what subsequently became the German empire, except Hamburg, Bremen, and a small part of Baden near Schaffhausen. The Reichsland of Alsace-Lorraine was incorporated 1871. The imperial constitution of 1871, Apr. 16, recognizes and ratifies the privilege of the free ports so to remain until 'they themselves demand admittance within the common customs-boundary.'

The principle of the Z.'s action was this: The whole territory embraced by the Union formed commercially (in regard, at least, to countries beyond its limits) one state. The duties on exports, imports, and through-transports were collected at all the frontiers of the Union according to a uniform tariff (subject to some concessions, made on special grounds, to individual states); and the proceeds, after paying the expenses of collection, were divided among the members of the Union, in proportion to their several populations. In regard to the internal trade of the Union, as the duties on articles manufactured for home consumption were different in the different states, a complicated system of drawbacks came into play, to put the commerce of all on equal footing.

The treaty of union was agreed on for a definite period of years, and was renewed from time to time, as in 1842, 53, 65, 67. In the latter year much was done to simplify the relations of the various states to one another in respect of internal trade; and the administration of the Z. was so modified as to give to the various members of the Union votes in its council and parliament proportionate to the number of inhabitants in each state.

Since the establishment of the German empire, the Z. has no longer a separate constitution of its own. Its council (representing governments) is merged in the federal council of the empire; its parliament (representing populations) in the reichstag. Affairs are managed on the principles adopted by the Z. 1867, by permanent committees of the federal council—viz., those for customs and taxes, for trade and commerce, and for finance.

The net income of the Z., which 1834 was 12,178,761 thalers, had risen 1871, the last year in which the Z. had separate accounts, to 28,000,002 thalers (about \$20,000,000).



## ZOMBOR—ZONETARIFF SYSTEM.

**ZOMBOR**, *zõm'bõr*: royal free town of Hungary, on a plain about 120 m. s. of Pesth, cap. of the dist. of Bacs, near the Francis canal. It has handsome county buildings, Greek and Rom. Cath. churches, gymnasium, barracks, town-house, etc. There is a brisk trade in grain and cattle.—Pop. (1880) 24,693; (1886) about 31,000.

**ZOMIDIN**, n. *zõ'mĩ-dĩn* [Gr. *zõmos*, broth; *eidos*, resemblance]: in *chem.*, Berzelius's name for that portion of the extract of meat which is insoluble in alcohol.

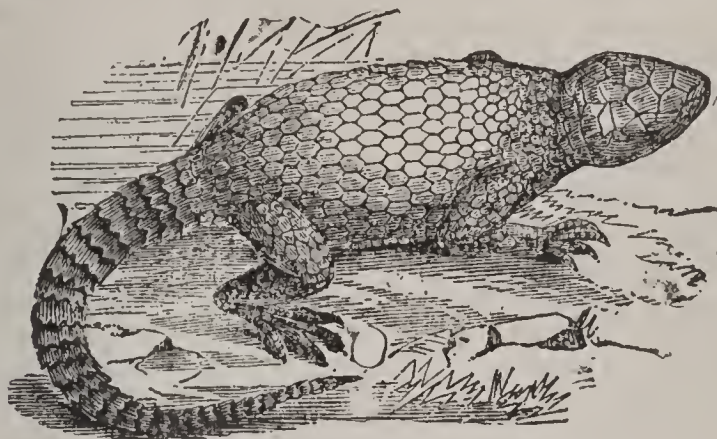
**ZONA**, n. *zõ'na* [L.—from Gr. *zõnē*, a girdle—from *zõnnumi*, to gird]: in *pathol.*, a name for shingles.

**ZONE**, n. *zõn* [F. *zõne*—from L. *zona*; Gr. *zõnē*, a belt or girdle—from *zõnnumi*, I gird: It. *zona*]: a belt or girdle; in *geography*, a climatic belt; one of the five great divisions of the earth's surface with respect to latitude and temperature, marked out by the two tropics and the polar circles, and respectively named the torrid zone, extending from tropic to tropic, from  $23\frac{1}{2}^{\circ}$  n. of the equator to  $23\frac{1}{2}^{\circ}$  s. of the equator; north temperate zone, from the torrid zone n. to the n. polar circle; south temperate zone, from the torrid zone s. to the s. polar circle; north frigid zone, from the n. polar circle to the n. pole; and south frigid zone, from the s. polar circle to the s. pole: in *math.*, the portion of the surface of a sphere included between two parallel planes; a band or stripe running round any object; a band or area encircling anything; in *OE.*, circumference. **ZONED**, a. *zõnd*, wearing a zone or girdle; having zones or concentric bands. **ZONE'LESS**, a. *-lēs*, destitute of a zone. **ZONAR**, n. *zõ'nēr*, or **ZONNAR**, n. *zõn'nēr*, a girdle which Christians and Jews are obliged to wear in certain Eastern countries to distinguish them from Mohammedans. **ZONATE**, n. *zõ'nāt*, in *bot.*, marked with concentric undulations, bands, or zones. **ZON'ULE**, n. *zõn'ũl*, a small zone or girdle; also **ZON'ULET**, n. *-ũ-lēt*.

**ZONE-TARIFF SYSTEM**, on Railways: system of charging a uniform passenger (and similarly freight) rate for all places within the same zone or belt as measured from some central point. The system originated in Hungary (where most of the railways are owned by the state), 1889, Aug. 1; and has proved popular and successful. Fourteen zones have been adopted, each of 25 kilometers (or about  $15\frac{1}{2}$  m.), Buda-Pesth being the central or starting-point, all places more than 350 kilometers from Buda-Pesth being included in the 14th zone, the fare for which (first-class) is 9 florins and 60 kreutzers on express trains, and 8 florins on ordinary trains. The system was introduced into Austria 1890, June 1, where there are 26 zones; the fare being 1 kreutzer per kilometer for third-class, 2 kreutzers per kilometer for second-class, and 3 kreutzers per kilometer for first-class. The system has been introduced also into Berlin (where it is in operation on the street railways); into Turkey, Servia, Bulgaria, and in Cork, Ireland, on the Blackrock and Passage railway.

## ZONURIDÆ—ZOÖLITE.

**ZONURIDÆ**, zō-nū'rĭ-dē: family of saurian reptiles, having the head covered with regular polygonal shields; body and tail with large scales; sides furnished with a longitudinal fold of the skin, covered with small scales; tongue flat nicked at the tip; eyes with two valvular lids. The



Zonurus.

species are numerous, natives of warm climates. The form of some is rather short and thick, others are long and serpent-like. In some also the limbs are well developed, in others they are merely rudimental, and in some the very rudiments of them are entirely concealed under the skin.

**ZOÖGRAPHY**, n. zō-ōg'ră-fĭ [Gr. zōōn, an animal; *graphō*, I write]: a description of animals, with their forms and habits. **ZOÖG'RAPHER**, n. -fēr, one who practices zoögraphy; one versed in descriptive zoology.

**ZOÖGYROSCOPE**, n. zō-o-jĭr'o skōp [from Gr. zōōn and Eng. *gyroscope*]: an amplification of the zoetrope, in which a series of successive instantaneous photographs of an animal in motion are placed on a circular rotating glass, the photographs being alternately illuminated by an oxyhydrogen lantern as the glass turns, throwing a single, continuous, ever-changing picture on a screen. Although the separate photographs show the successive positions of an animal in motion, the zoögyroscope throws on the screen a vivid presentment of a moving animal.

**ZOÖID**, n. zō'oyd [Gr. zōōn, an animal; *eidos*, resemblance]: a small and imperfect animal; an individual of a compound or colonial animal organism.

**ZOOKS**, int. zûks [contracted from *by God's looks*]: an old form of oath.

**ZOÖLATRY**, n. zō-ōl'ă-trĭ [Gr. zōōn, an animal; *latreia*, worship]: animal-worship.

**ZOÖLITE**, n. zō'ōl-ĭt [Gr. zōōn, an animal; *lithos*, a stone]: a petrified or fossil animal. **ZOÖLITHIC**, a. zō'ō-lĭth'-ĭk, of or pertaining to a zoölite.



## ZOÖLOGICAL STATIONS.

ZOÖLOGICAL STATIONS: places on the sea-coast at which institutions have been erected and furnished with all apparatus helpful in the study of zoology. The first establishment of this kind, due mainly to the labors of A. Dohrn, was the spacious 'Stazione Zoologica' founded at Naples 1872, opened 1874. It is of international character, and since 1880 has received a yearly endowment of about \$7,500 from Germany. The Brit. Assoc. also makes a grant, and has the use of a table here. In addition to the magnificent spaces below stocked with various kinds of sea-inhabitants, it has rooms above for accommodation of fifty students, provided with every desirable apparatus. Institutions similar, but on a much smaller scale, have since been set up at Triest (1875), at Roscoff (Brittany), at Wimereux, near Boulogne, at Concarneau (Brittany) and Marseilles, at Archangel, and in the United States at Newport, R. I. In 1884 a well-equipped marine station was opened at Granton, near Edinburgh; and the Marine Biological Association is promoting the establishment of a first-rate laboratory on Plymouth Sound.

# ZOOLOGY.

**ZOOLOGY**, n. zō-ōl'ō-jī [Gr. zōōn, an animal; *logos*, a discourse]: that branch of natural history which treats of the structure, habits, classification, etc., of all animals. **ZOOLOGICAL**, a. zō-ō-lōj'ī-kāl, of or pertaining to zoology. **ZOÖLOG'ICALLY**, ad. -lī. **ZOÖL'OGIST**, n. -jīst, one versed in the natural history of animals.

**ZOÖL'OGY**: that branch of natural history which has for its subject the Animal (q.v.) Kingdom. It is itself divided into a number of branches, which are often pursued as distinct sciences, the subject being too large to be thoroughly studied except in this manner; though it is necessary that the results of investigation in particular departments should be brought together, so that the animal kingdom may be viewed as a whole, and the relations of the most widely different groups of animals to each other determined. The branches of Z. relating to the inferior classes of *Vertebrata* are thus named: that which has *Birds* for its subject is universally known as *Ornithology* (q.v.); that which relates to *Reptiles* is *Herpetology* (q.v.), and the subordinate branch relating to serpents is sometimes called *Ophiology*; that which relates to *Fishes* is *Ichthyology* (q.v.). Among *Invertebrate Animals*, the great group of *Mollusca* is the subject of the science of *Malacology* (q.v.), though this term is seldom used; and when shells rather than the animals which bear them are considered, the term *Conchology* (q.v.) is employed. No particular term is commonly applied to the branches of Z. which treat of the *Crustacea*, *Arachnida*, etc.; but that which relates to *Insects* is universally known as *Entomology* (q.v.), and *Helminthology* (q.v.) has *Worms* for its subject. No similar terms are used for the branches of this science which relate to other groups of *Invertebrata*.

The science of Z., however, divides itself into distinct sciences, not so much in accordance with the divisions of the animal kingdom, as with regard to particular aspects of the subject which may be studied either in relation to animals generally or to any particular species. Thus, *Anatomy* (q.v.) may be regarded as a branch of Z., when the term Z. is taken in its largest sense, as including man as well as the inferior animals; and *Ethnology* (q.v.) must in like manner be considered as belonging to it. The anatomy of the inferior animals is sometimes called *Zoöatomy*, and the term *Comparative Anatomy* is employed when their structure is studied in relation to that of man, and the structure of one division of the animal kingdom in relation to that of the others. *Physiology* (q.v.) is one of the most important branches of Z.; and with it that branch of chemistry which treats of animal substances is closely connected. A very interesting branch of Z. is that which relates to the habits and instincts of animals. It can hardly be said to have been constituted into a separate science, but has received much attention from those naturalists who have devoted themselves to the study of particular groups of animals. See **ANIMAL**.

We have no evidence that the study of Z. was prosecuted to any considerable extent before the time of Aristotle.



In his hands it became at once a science, and the foundations of a system of classification were laid. No artificial system of classification has ever been proposed in Z., like the sexual system of Linnæus in botany; but from the very first to the present day, a natural grouping of animals has always been attempted. To this the widely marked distinctions between the principal groups almost unavoidably led. Aristotle brought to bear on the subject the highest powers both of observation and of generalization, and some of the groups established by him retain their place in the most modern systems. Ælian and Pliny show no capacity for the scientific treatment of the subject; and in their writings facts are largely mingled with fables. During the middle ages, Z., like kindred sciences, was neglected: for many centuries the only name worth mentioning in connection with the history of the science is that of Albertus Magnus; whose knowledge, however, was entirely derived from Aristotle and other ancient authors. From his time, in the first half of the 13th c., to the beginning of the 16th, Z. was again almost completely neglected; but the new activity of mind which then displayed itself soon sought this as well as other directions, and an especial impulse was given to Z. by the progress of geographical discovery. The names of Belon (q.v.) and Rondelet (q.v.) are the two greatest in this department at this period, and by them Z. was enriched with many new facts, while attempts were made at a more perfect classification. Aldrovandi (q.v.) and Gesner (q.v.) soon followed, besides others who began to direct their attention more especially to particular branches of Z.; but it was not till after the middle of the 17th c. that any real progress was made in classification founded on a philosophical study and comparison of animals. The works of Ray (q.v.) are described by Cuvier as 'the foundation of modern zoölogy.' The materials, however, were in great part prepared, and the first outline of a system sketched, by Willughby. From the days of Aristotle, Z. had never been prosecuted with such acuteness of observation, accuracy of description, and breadth of philosophical generalization as it was by Willughby and Ray. The progress of the science now became very rapid. Buffon won for it, by his interesting descriptions and brilliant style, the general attention of the educated portion of society in his own and in other countries. He was almost immediately followed by Linnæus, who, extending his studies from botany to Z., not only enlarged the science by his own observations and discoveries, but rendered it far greater service by gathering together the facts ascertained by others, and by the improvement which he effected in classification. Some of the larger groups established by Linnæus have been retained by all subsequent naturalists without essential modification of their characters, and even his smallest groups—genera—have been very generally retained, though now regarded as constituting tribes or families. According to the Linnæan system, the animal kingdom is divided into six great classes, further brought together in groups of two each, as follows:

# ZOOLOGY.

Heart bilocular, with two auricles, } blood warm, red,	Viviparous. } Oviparous.	1. Mammalia. 2. Birds.
Heart unilocular, with one auricle, } blood cold, red,	With lungs } With gills.	3. Amphibia. 4. Fishes.
Heart unilocular, with one auricle, } circulating fluid ( <i>sanies</i> ) cold, white,	With antennæ. } With tentacula.	5. Insects. 6. Vermes.

It was, however, in constituting and defining the genera that Linnæus showed in the highest degree his powers both of observation and of arrangement. His labors in the lower departments of the animal kingdom were much less perfect than in the higher; but others speedily entered on the field, and while new species of animals and their habits continued to be described, the study of comparative anatomy also was diligently prosecuted. The names of Pallas, Hunter, and Blumenbach particularly are worthy of notice; but more than any other the name of Cuvier, who, like Linnæus, took a comprehensive view of the whole subject of Z., and carried forward the work of minute observation as well as of generalization. His system of classification is so vast an improvement on that of Linnæus as to be almost fundamentally new, and has formed a new starting-point for all further progress. For the divisions, the classes, and many of the orders of Cuvier's system, see their respective titles; it suffices here to give a general outline of the system.

DIV. I. VERTEBRATA.	Class 1. Mammalia.
	“ 2. Aves (Birds).
	“ 3. Reptilia (Reptiles).
	“ 4. Pisces (Fishes).
DIV. II. MOLLUSCA.	Class 1. Cephalopoda.
	“ 2. Pteropoda.
	“ 3. Gasteropoda.
	“ 4. Acephala.
	“ 5. Brachiopoda.
	“ 6. Cirrhopoda.
DIV. III. ARTICULATA.	Class 1. Insecta (Insects).
	“ 2. Crustacea.
	“ 3. Arachnida.
	“ 4. Annelida.
DIV. IV. RADIATA.	Class 1. Echinodermata.
	“ 2. Entozoa.
	“ 3. Acalephæ.
	“ 4. Polypi.
	“ 5. Infusoria.

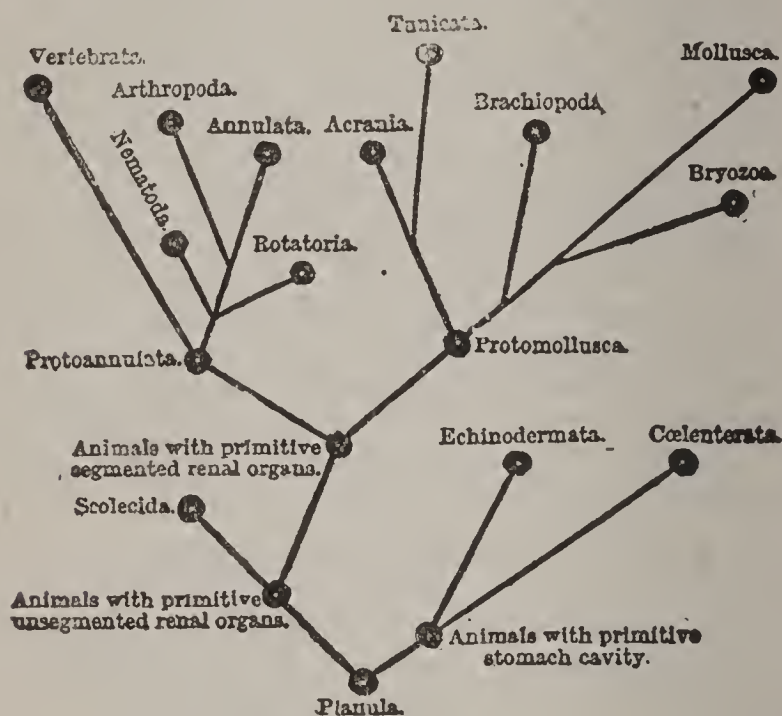
The system of Cuvier has been extensively modified by many subsequent anatomists; notably Lamarck, De Blainville, Ehrenberg, Owen, Milne-Edwards, Von Siebold and Stannius, Leuckart, Agassiz, Huxley, Haeckel, and others. The accompanying outline, while serving to give an idea of the present state of classification, must not be regarded as authoritative or final, since the rapid progress of knowledge is introducing incessant change in our conceptions of the relations of the greater groups. The reverse error



# ZOOLOGY.

must, however, be guarded against—that of supposing one classification as good as another, for each really marks a stage of progress. The taxonomy of the various groups, too, has reached a considerably greater degree of permanence.

The most remarkable waves of progress in Z. since Cuvier have been due at first to the splendid morphological impulse of Geoffroy St. Hilaire (q.v.); to the prosecution, in the light of the cell-theory, of the study of the simplest forms of life and of the minute structure of the



higher animals; to the pursuit of embryology under Von Baer (q.v.) and his successors; and, finally, in the highest degree to Darwin's labors, in the regions both of observation and of theory. Influenced by the theory of evolution (see DARWINIAN THEORY: DESCENT OF MAN: SPECIES, ORIGIN OF: GEOGRAPHICAL DISTRIBUTION: ETC.), and aided by embryology, the zoölogist now seeks to arrange his forms in series which should represent not merely resemblance of adult structure, but also should indicate as nearly as possible the hypothetical lines of descent by which he believes these forms to have originated. Thus various recent authors, notably Haeckel and Semper, have constructed 'phylogenetic' classifications of the animal kingdom in the form of genealogical trees; but these speculations, however ingenious and suggestive, cannot supersede the existing classifications, at least while our knowledge of embryology, and especially of paleontology, remains so imperfect; for the line of descent has been made out with probability only in the case of a few genera, such as the horse (see MAMMALIA) and crocodile. It may be interesting, however, to preface the in general Huxleyan classification by the above example of a genealogical tree, borrowed from Semper.

# ZOÖLOGY.

## I. PROTOZOA.

Section A. MONERA.—Class 1. Monera.

Section B. ENDOPLASTICA.—Class 2. Rhizopoda; 3. Foraminifera; 4. Heliozoa; 5. Radiolaria; 6. Infusoria; 7. Gregarinida.

## II. PORIFERA.

Class 1. Myxospongiæ; 2. Fibrospongiæ; 3. Calcispongiæ.

## III. CŒLENTERATA.

Class I. HYDROZOA—

Sub-class i. Hydroida.—Order 1. Hydridæ; 2. Corynidæ; 3. Sertularidæ; 4. Campanularidæ.

Sub-class ii. Siphonophora.—Order 5. Calycophoridæ; 6. Physophoridæ.

Sub-class iii. Discophora.—Order 7. Medusidæ; 8. Lucernaridæ.

Sub-class iv. Graptolitida (extinct).—Order 9. Graptolitidæ.

Class II. ACTINOZOA—

Sub-class i. Coralligena.—Order 1. Zoantharia, (a) Malacodermata, (b) Sclerodermata, (c) Sclerobasica; 2. Alcyonaria; 3. Rugosa (extinct).

Sub-class ii. Ctenophora.—Order 4. Ctenophora.

## IV. VERMES.

Class I. PLATYELMIA.—Order 1. Turbellaria; 2. Nemertea; 3. Trematoda; 4. Cestoidea.

Class II. NEMATELMIA.—Order 1. Nematoda; 2. Gordiacea.

Class III. ACANTHOCEPHALA (*Echinorhynchus*).

Class IV. CHÆTOGNATHA (*Sagitta*).

Class V. ROTATORIA.

Class VI. ENTEREPNEUSTA (*Balanoglossus*).

Class VII. GEPHYREA.

Class VIII. ANNELIDA—

Sub-class i. Discophora.

Sub-class ii. Choetopoda.—Order 1. Achæta; 2. Oligochoæta; 3. Polychæta (Tubicola, Errantia).

Class IX. POLYZOA.

Class X. BRACHIOPODA.

## V. ARTHROPODA.

Class I. PROTOTRACHEATA (*Peripatus*).

Class II. MYRIAPODA.—Order 1. Chilognatha; 2. Chilopoda.

Class III. INSECTA—

Section A. Ametabola.—Order 1. Anoplura; 2. Mallophaga; 3. Thysanura.

Section B. Hemimetabola.—Order 4. Neuroptera; 5. Hemiptera; 6. Orthoptera.

Section C. Holometabola.—Order 7. Aphaniptera; 8. Diptera; 9. Hymenoptera; 10. Lepidoptera; 11. Strepsiptera; 12. Coleoptera.

Class IV. CRUSTACEA.—Order 1. Trilobita (extinct); 2. Phyllopoda. (a) Branchiopoda, (b) Cladocera; 3. Cumacea; 4. Edrioplithemia, (a) Amphipoda, (b) Isopoda; 5. Stomatopoda; 6. Copepoda; 7. Ostracoda; 8. Cirripedia; 9. Schizopoda; 10. Decapoda, (a) Macrura, (b) Brachyura.

Class V. ARACHNIDA.—Order 1. Merostomata, (a) Xiphosura, (b) Eurypterida (extinct); 2. Arthrogastra; 3. Araneina; 4. Acarina; 5. Linguatulina.

## VI. ECHINODERMATA.

Class 1. Echinoidea; 2. Asteroidea; 3. Ophiuroidea; 4. Crinoidea; 5. Holothuroidea; 6. Blastoidea (extinct); 7. Cystoidea (extinct).

## VII. MOLLUSCA.

Class I. LAMELLIBRANCHIATA—

Section A. Dimya —Order 1. Asiphonida; 2. Siphonida.

Section B. Monomya.

Class II. POLYPLACOPHORA.

Class III. SCAPHOPODA.

Class IV. GASTEROPODA—

Section A. Prosobranchiata.

Section B. Opisthobranchiata.

Section C. Pulmonata.

Section D. Heteropoda.



# ZOOLOGY.

Class V. PTEROPODA—

Order 1. Thecosomata; 2. Gymnosomata.

Class VI. CEPHALOPODA—

Section A. Tetrabranchiata.

Section B. Dibranchiata.—Order 1. Decapoda; 2. Octopoda.

## VIII. TUNICATA.

Class I. PERENNICHORDATA (*Appendicularia*).

Class II. CADUCICHORDATA—

Section A. Simplicia.

Section B. Composita.

Section C. Consorta.

## IX. VERTEBRATA.

$\alpha$  ACRANIATA (*Amphioxus*).

$\beta$  CRANIATA.

Class I. ICHTHYOPSIDA—

Section A. Cyclostomata.

Section B. Pisces.—Order 1. Elasmobranchii; 2. Holocephala; 3. Ganoidei; 4. Teleostei, ( $\alpha$ ) Physostomi, ( $\beta$ ) Anacanthini, ( $\gamma$ ) Acanthopteri, ( $\delta$ ) Pharyngognathi, ( $\epsilon$ ) Lophobranchii, ( $\zeta$ ) Plectognathi; 5. Dipnoi.

Section C. Amphibia.—Order 1. Urodela; 2. Anura; 3. Gymnophiona; 4. Labyrinthodonta (extinct).

Class II. SAUROPSIDA—

Section D. Reptilia.—Order 1. Lacertilia; 2. Chelonina; 3. Ophidia; 4. Crocodilia; 5. Plesiosauria; 6. Ichthyosauria; 7. Dinosauria; 8. Pterosauria (the last five extinct).

Section E. Aves—

i. Saururæ (*Archæopteryx*).

ii. Ratitæ (*Cursores*).

iii. Carinatae.—Order 1. Natatores; 2. Grallatores; 3. Rasores, ( $\alpha$ ) Gallinacei, ( $\beta$ ) Columbacei; 4. Scansores; 5. Insesores or Passeres, ( $\alpha$ ) Dentiostres, ( $\beta$ ) Conirostres, ( $\gamma$ ) Tenuirostres, ( $\delta$ ) Fissirostres; 6. Raptores.

Class III. MAMMALIA—

Section i. Ornithodelphia.—Order 1. Monotremata.

Section ii. Didelphia.—Order 2. Marsupialia.

Section iii. Monodelphia (or Placentalia).—Order 3. Edentata; 4. Ungulata, ( $\alpha$ ) Perissodactyla, ( $\beta$ ) Artiodactyla; 5. Sirenia; 6. Toxodontia (extinct); 7. Dinocerata (extinct); 8. Tillodontia (extinct); 9. Hyracoidea; 10. Proboscidea; 11. Carnivora; 12. Cetacea; 13. Insectivora; 14. Rodentia; 15. Cheirop-tera; 16. Primates, ( $\alpha$ ) Lemuridæ, ( $\beta$ ) Simiadæ, ( $\gamma$ ) Anthropidæ.

An example of the most recent genealogical classification is the following by Ray Lankester, omitting here the orders except among the higher vertebrates, and with a diagram representing the genealogical tree according to his system. The diagram on next page, together with the fact that Lankester gives large place to Dohrn's doctrine of the degeneration of forms, as well as to the branching out of phyla from an original stock, will serve to explain why in this system the higher groups occupy a central place, and the usual order is changed in other respects also. Of course all such arrangements are very hypothetical.

## Grade A. PLASTIDOOZA (PROTOZOA).

Grade  $\alpha$ . GYMNOZYXA—

Class I. Proteomorpha (no orders recognized).

Class II. Mycetozoa.

Class III. Lobosa.

Class IV. Labyrinthulidea (no orders).

Class V. Heliozoa.

Class VI. Reticularia.—Sub-class  $\alpha$ . Imperforata;  $\beta$ . Perforata.

Class VII. Radiolaria.—Sub-class  $\alpha$ . Silicoskeleta;  $\beta$ . Acanthinoskeleta.

# ZOOLOGY.

Grade b. CORTICATA.—

Class I. Sporozoa.—Sub-class *a*. Gregarinidea; *b*. Coccidiidea;  
*c*. Myxosporidea (no orders); *d*. Sarcocystidea (no orders).

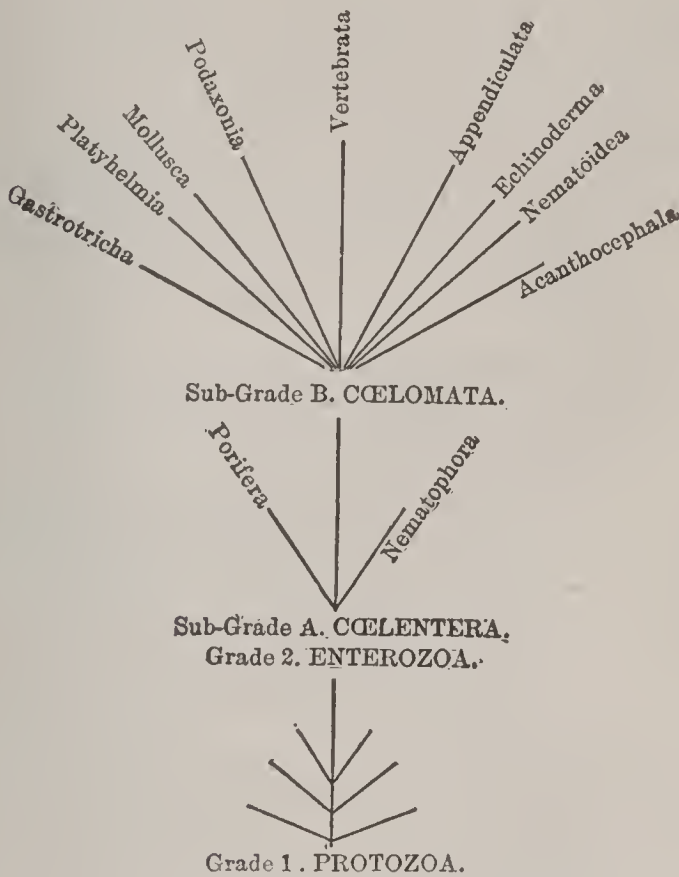
Class II. Flagellata.—Sub-class *a*. Lissoflagellata; *b*. Choanoflagellata.

Class III. Dinoflagellata.

Class IV. Rhynchoflagellata (no orders).

Class V. Ciliata.

Class VI. Acinetaria.



Genealogical Tree of Animal Kingdom.

Grade B. ENTEROZOA.

Sub-grade A. CŒLENTERA.

Phylum 1. NEMATOPHORA.

Class I. Hydromedusæ.

Class II. Scyphomedusæ.—Sub-class *a*. Tetrameralia; *b*. Octomeralia.

Class III. Anthozoa.—Sub-class *a*. Actiniomorpha; *b*. Alcyonimorpha.

Class IV. Ctenophora.

Phylum 2. PORIFERA.

Class I. Calcispongiæ (= *Megamastictora*).

Class II. Silicospongiæ (= *Micromastictora*).—Sub-class 1. Hyalospongiæ; 2. Demospongiæ.

Sub-grade B. CŒLOMATA.

Phylum 1. VERTEBRATA.

Branch A. HEMICHORDA (*Balanoglossus*).

Branch B. UROCHORDA—

Grade I. Larvalia (no divisions recognized).

Grade II. Saccata.

Class I. Ascidie.

Class II. Salpiformia.



# ZOOLOGY.

Branch C. CEPHALOCHORDA (*Amphioxus*).

Branch D. CRANIATA—

Grade I. Cyclostoma.

Class I. Myxinoidea (no orders).

Class II. Petromyzontia (no orders).

Grade II. Gnathostoma.

Sub-grade *a*. Branchiata Heterodactyla.

Class I. Pisces.—Sub-class 1. Selachii; 2. Holocephali (no orders); 3. Ganoidei; 4. Teleostei.

Class II. Dipnoi.

Sub-grade *b*. Branchiata Pentadactyla.

Class I. Amphibia.—Sub-class 1. Urodela; 2. Gymnophiona (*Cæcilia*, etc.); 3. Stegocephala (*Labyrinthodon*, etc.); 4. Anura (*Rana*, etc.).

Sub-grade *c*. Lipobranchia Pentadactyla.

Branch *a*. Monocondyla.

Class I. Reptilia.—Sub-class 1. Chelonia (orders not tabulated); 2. Lacertilia; 3. Ophidia; 4. Crocodilia; 5. Plexosauria (orders not tabulated); 6. Dinosauria; 7. Anomodontia (*Dicynodon*, etc.); 8. Plesiosauria; 9. Ichthyosauria.

Class II. Aves.—Grade *a*. Phanerodactyla; *b*. Cryptodactyla.

Branch *b*. Amphicondyla.

Class. Mammalia.

Grade 1. Monotrema (*Ornithorhynchus* and *Echidna*).

Grade 2. Ditrema.

Branch *a*. Marsupialia.

Branch *b*. Placentalia.—Sub-branch *a*. Typidentata: Orders. 1. Proinsectivora; 2. Insectivora; 3. Carnivora; 4. Cetacea; 5. Ungulata; 6. Amblypoda; 7. Sirenia; 8. Toxodontia; 9. Rodentia; 10. Proboscidea; 11. Hyracoidea; 12. Cheiroptera; 13. Prosimiæ; 14. Simiæ. Sub-branch *b*. Edentata.

## Phylum 2. ECHINODREMA.

Branch A. AMBULACRATA—

Class I. Holothuridea.

Class II. Echinoidea.—Grade *a*. Palæechini (*Melonites*, *Eocidaris*); *b*. Autechini: Branch 1. Desmosticha; 2. Petalosticha.

Class III. Asteroidea.

Class IV. Ophiuroidea.

Branch B. TENTACULATA—

Class I. Crinoidea.

Class II. Cystoidea.

Class III. Blastoidea.

## Phylum 3. PODAXONIA.

Class I. Gephyræa.—Sub-class 1. Echiuromorpha; 2. Sipunculomorpha.

Class II. Polyzoa.—Sub-class 1. Vermiformia; 2. Eupolyzoa.

Branch *a*. Ectoprocta; *b*. Entoprocta (*Loxosoma*, etc.).

Class III. Brachiopoda.

## Phylum 4. NEMATOIDEA.

Class I. Eunematoidea (no orders).

Class II. Chætosomaria (*Chætosoma*, *Rhabdogaster*).

Class III. Chætogonatha (*Sagitta*, *Spadella*).

## Phylum 5. ACANTHOCEPHALA.

## Phylum 6. GASTROTRICHA.

## Phylum 7. PLATYHELMIA.

Branch A. CILIATA—

Class I. Rhabdocœla.

Class II. Dendrocœla.

Class III. Nemertina.

[The *Mesozoa* of Van Beneden may be classed here as a degenerate parasitic group including *Orthonectida* and *Rhombozoa*.]

# ZOON—ZOONOMY.

## Branch B. COTYLOPHORA—

- Class I. Trematoidea.—Sub-class *a*. Monogenea; *b*. Digenea.
- Class II. Cestoidea.
- Class III. Hirudinea.

## Phylum 8. APPENDICULATA.

### Branch A. ROTIFERA—

- Class I. Parapodiata.
- Class II. Lipopoda.

### Branch B. CHÆTOPODA—

- Class I. Polychæta.—Sub-class 1. Errantia (orders not tabulated);  
2. Sedentaria (orders not tabulated).
- Class II. Oligochæta.
- Class III. Myzostomaria.
- Class IV. Saccocirridea.
- Class V. Haploannelida.

### Branch C. ARTHROPODA (= *Gnathopoda*)—

- Grade 1. Ceratophora.
- Class I. Paripatidea.
- Class II. Myriapoda.
- Class III. Hexapoda.

#### Grade 2. Acerata.

- Class I. Crustacea.—Grade 1. Entomostraca; 2. Leptostraca;  
3. Malacostraca: Branch *a*. Arthrostraca; *b*. Thoracos-  
traca.
- Class II. Arachnida.—Grade *a*. Delobbranchia; *b*. Embolo-  
branchia; *c*. Lipobbranchia.
- Class III. Pantopoda.
- Class IV. Tardigrada.
- Class V. Linguatulina

## Phylum 9. MOLLUSCA.

### Branch A. GLOSSOPHORA—

- Class I. Gastropoda. — Grade 1. Isopleura; 2. Anisopleura:  
Branch *a*. Streptoneura; *b*. Euthyneura.
- Class II. Scaphopoda.
- Class III. Cephalopoda (= *Siphonopoda*).

### Branch B. LIPOCEPHALA—

- Class Lamellibranchia.

**AUTHORITIES.**—GENERAL MORPHOLOGY AND CLASSIFI-  
CATION—Linnæus, *Systema Naturæ*; Cuvier, *Règne Ani-  
mal*; Lamarck, *Histoire des Anim. s. Vertèbres*; Owen, *Comp.  
Anat. of Vertebrates*; Bronn's *Klassen u. Ordnung d. Thier-  
reichs*; Huxley, *Anat. of Vertebrated Animals* (1871), and  
*Anat. of Invertebrated Animals* (1875); Claus, *Lehrb. d.  
Zoologie* (1882); Gegenbaur, *Introd. to Comp. Anat.* (1875);  
Balfour's *Embryology* (1881). **PHYSIOLOGY**—Milne-  
Edwards, *Leçons s. la Physiologie*. **DISTRIBUTION**—Wal-  
lace, *On Distribution of Animals* (2 vols. 1876). **ÆTIOLOGY**  
—Darwin's *Origin of Species*, and other works. For bibli-  
ography of special subjects, see works of Bronn, Claus,  
Huxley, and Gegenbaur, above cited.

See also ANIMAL KINGDOM: VERTEBRATA: MAMMALIA:  
BIRDS: FISHES: REPTILES: and the titles of the several  
animals.

**ZOÖN**, n. zō'ōn [Gr. zōōn, an animal]: in *biol.*, the prod-  
uct of a fertilized ovum.

**ZOÖNOMY**, n. zō-ōn'ō-mī [Gr. zōōn, an animal; *nomos*,  
law]: the science which treats of the laws of organic life in  
animals; animal physiology.



## ZOÖPHAGOUS—ZOÖSPORE.

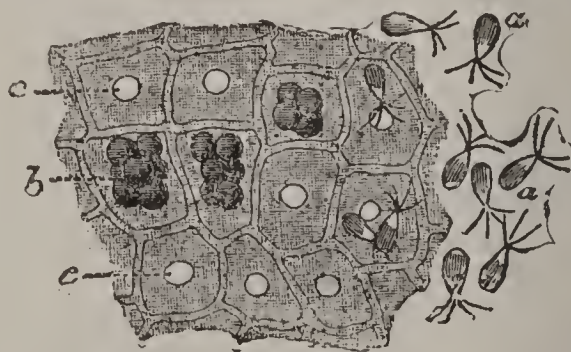
**ZOÖPHAGOUS**, a. *zō-ōf'ă-gūs* [Gr. *zōōn*, an animal; *phāgein*, to eat]: feeding or preying on other animals. **ZOÖPH'AGAN**, n. *-gūn*, an animal that feeds on animal food.

**ZOÖPHILOUS**, a. *zō-ōf'īl-ūs* [Gr. *zōōn*, an animal; *philēō*, I love]: in *bot.*, fertilized by the agency of insects or other animals.

**ZOÖPHYTE**, n. *zō-ō-fīt* [Gr. *zōōn*, an animal; *phuton*, a plant]: a compound animal whose colonies resemble a vegetable; a colony of polyps; one of the *Zoöphyta*, a term employed by Cuvier, in his earlier attempts at classification, in the same sense as he afterward employed *Radicta*—the lowest primary division of the animal kingdom, which includes many animal organisms that are fixed to a definite spot of rock, shell, etc., and have more or less superficial resemblance to plants—e.g., corals, sea-anemones, etc.: see **ZOÖLOGY**. The term is now disused by scientific naturalists. **ZOÖPHYT'IC**, a. *-fīt'ik*, or **ZOÖPHYT'ICAL**, a. *-ī-kūl*, pert, to or composed of zoöphytes. **ZOÖPHYTOLOGY**, a. *zō-ō-fī-tōl'ō-jī* [*zoöphyte*, and Gr. *logos*, a discourse]: the department of natural history which treats of the structure, mode of growth, etc., of sponges, corals, etc.

**ZOÖSPERM**, n. *zō-ō-spērm* [Gr. *zōōn*, an animal; *sperma*, seed]: in *bot.*, one of the locomotive spores of some algæ and fungi; a zoöspore; an antherozoid; in *zool.*, a male seed-cell; a spermatozoön.

**ZOÖSPORE**, n. *zō-ō-spōr* [Gr. *zōōn*, an animal; *spora*, seed]: one of the active spores of certain algæ or seaweeds, which are endowed with motion; a zoöspERM. *Zoöspore* is the name given in botany to those Spores (q.v.) of many lower algæ and fungi which, being furnished with cilia, move spontaneously for a short time after being discharged from the spore-case of the parent plant. The motions of their cilia resemble those of the cilia on the Epithelium (q.v.) of the higher animals. The purpose served by the



Portion of Thallus of a Green Seaweed (*Ulva*):

*a*, free zoöspores, each with four cilia; *b*, young zoöspores forming from protoplasm of cell; *c*, opening in cell-wall by which zoöspores have escaped.

ciliary motion in zoöspores is evidently the wider diffusion of the species; and the cessation of the motion after a certain time permits the spore to become fixed, in order to germination, which is frequently preceded by conjugation. They are apt to be mistaken by observers with the microscope for Infusoria (q.v.).

## ZOÖTHECA—ZORNDORF.

**ZOÖTHECA**, n. *zō-ō-thē'ka* [Gr. *zōōn*, an animal; *thēkē*, a case]: in *bot.*, a cell containing a spermatozoid.

**ZOÖTOMY**, n. *zō-ōt'ō-mĭ* [Gr. *zōōn*, an animal; *tomē*, a cutting]: the branch of anatomical science which relates to the structure of animals; the dissection or anatomy of animals. **ZOÖTOMICAL**, a. *zō'ō-tōm'ī-kal*, pertaining to zoötomy. **ZOÖTOMIST**, n. *zō-ōt'ō-mĭst*, one who dissects the bodies of animals; one versed in zoötomy.

**ZOO-ZOO**, n. *zō'zō* [onomatopoeic]: wood-pigeon (*prov. Eng.*).

**ZOPISSA**, n. *zō-pĭs'sa* [L.—from Gr. *zopissa*]: in *pathol.*, a mixture of pitch and tar impregnated with salt water, scraped from the hulls of ships. It was formerly used as an external application, being believed to be resolute and desiccative.

**ZORIL**, or **ZORILLE**, n. *zōr'ĭl* [Sp. *zorillo*, whelp of a fox—from *zorro*, a male fox]: a small skunk-like animal of Africa and Central America.

**ZORNDORF**, *zorn'dorf*, Ger. *tsorn'dorf*: village in Prussia, 4 m. n. of Küstrin; scene of the bloodiest of the many desperate conflicts of the *Seven Years' War* (q.v.). The Russians having for the second time been ordered by the Czarina Elizabeth to invade Prussia, advanced toward Berlin, committing frightful devastations, while Frederick the Great, with the bulk of his forces, was engaged with the Austrians in Silesia and Saxony. The Russians, under Fermor, were 50,000 strong, and easily drove before them Dohna's little Prussian army of 15,000; but Frederick being speedily apprised of this new invasion, hastened northward with such a reinforcement as raised the army to 30,000; and after taking care, by the breaking down of bridges, etc., to cut off their retreat, engaged the invaders. The battle, 1758, Aug. 25, from 8 A.M. till evening, consisted mainly in a succession of furious charges, accompanied with a tremendous artillery-fire, and was not decided till Seidlitz, by an able movement, turned the Russian flank. The Russians, now discovering that they were nearly surrounded, fought with the utmost desperation, and ultimately both armies bivouacked on the field of battle. In the morning, however, Fermor drew off his forces, diminished by 20,000 men, 103 cannon, and 27 standards; having inflicted on the Prussians a loss of 13,000 men, 26 cannon, and a few standards. Generals Soltikof, Czernitchef, and Prince Sulkowski were made prisoners by the Prussians on this occasion; and it is remarkable that the first named was the conqueror of Frederick II. in the next great battle between the two northern powers, at Kunersdorf (q.v.).



## ZOROASTER.

ZOROASTER, *zō-rō-ās'tér*, or ZARATHUSTRA, *za-ra-thós'-tra* (which in Greek and Latin was corrupted into ZARASTRADES and ZOROASTRES; while the Persians and Parsees altered it into ZERDUSHT): founder of what is now known as the Parsee religion: whose date and place of birth are conjectural (see below). The original meaning of the name is uncertain, and though there have been many conjectures about it, not one of them seems supported by recent investigations. Probably Z. indicates only the notion of 'Chief,' 'Senior,' 'High-priest,' and was a common designation of a spiritual guide and head of a district or province. Indeed, the founder of Zoroastrianism is hardly ever mentioned without his family name—Spitama. He seems to have been born in Bactria. The terms that he applied to himself are either Manthran, i.e., a reciter of Manthras; a messenger sent by Ahuramazda; a speaker; one who listens to the voice of oracles given by the spirit of nature; one who receives sacred words from Ahuramazda through the flames. His life is completely shrouded in darkness. Both the Greek and Roman, and most of the Zend accounts about his life and works are legendary and utterly unhistorical. In the latter, he is to a great extent represented, not as a historical, but as a dogmatical personality, vested with superhuman, or rather divine powers, standing next to God, above the archangels themselves. His temptations by the devil, whose empire is threatened by him, form the subject of many traditional reports and legends. He is represented as the abyss of all wisdom and truth, and the master of the whole living creation. 'We worship'—so runs one of the prayers in the Fravardin Yasht—'the rule and the guardian angel of Zarathustra Spitama, who first thought good thoughts, who first spoke good words, who first performed good actions, who was the first priest, the first warrior, the first cultivator of soil, the first prophet, the first who was inspired, the first who has given to mankind nature, and reality, and word, and hearing of word, and wealth, and all good things created by Mazda, which embellish reality; who first caused the wheel to turn among gods and men, who first praised the purity of the living creation and destroyed idolatry, who confessed the Zarathustrian belief in Ahuramazda, the religion of the living God against the devils. . . . Through whom the whole true and revealed word was heard, which is the life and guidance of the world. . . . Through his knowledge and speech, the waters and trees become desirous of growing; through his knowledge and speech, all beings created by the Holy Spirit are uttering words of happiness.'

In the old Yazna (see ZEND-AVESTA) alone, he appears like a living reality, a man acting a great and prominent part in the history of his country and that of mankind. His father's name seems to have been Pourushâspa, and that of his daughter, the only one mentioned of his children, Pouruchîsta. Very obscure, however, remains, even by this account, the time when he lived. The dates generally given are as follows. Xanthos of Lydia places him about 600 years before the Trojan war, i.e., about B.C. 1750;

Aristotle and Eudoxus place him 6,000 years before Plato, i.e., about B.C. 6500; others, 5,000 years before the Trojan war, i.e., about B.C. 5500. Berosos, Babylonian historian, makes him a Babylonian king, and the founder of a dynasty which reigned in Babylon B.C. 2200—2000. The Parsees place him at the time of Hystaspes, Darius's father, whom they identify with a king mentioned in the *Shâh-Nâmeh* (q.v.), from whom, however, Hystaspes is totally distinct: this account would place him at about B.C. 550. Probably he must be considered to belong to an age, not later than B.C. 1000; possibly, he was a contemporary of Moses. It is almost certain that Z. was one of the *Soshyantôs*, or fire-priests, with whom first arose the religious reform, which he boldly developed. These were probably at first identical with the Vedic *Atharvans* (fire-priests), as indeed Zoroastrianism is merely an advanced stage of Brahmanism. The former creed, that of Ahura, by way of eminence, transformed, after the outbreak of the schism, the good beings of the latter into devils or devas; e.g., the purely Brahmanic Indra, Sharva, Nâsatya, etc.—unless it promoted them into saints and angels (*yagatas*). The conflict that led to this schism between the Iranians and those Aryan tribes which immigrated into Hindustan Proper, and whose leaders became afterward founders of Brahmanism, sprang from many social, political, and religious causes. The Aryans seem to have originally led a nomad life, until some of them, reaching, in their migrations, lands fit for permanent settlements, settled down into agriculturists. Bactria and the parts between the Oxus and Jaxartes seem to have attracted them most. The Iranians became gradually estranged from their brother tribes, who adhered to their ancient nomad life; and by degrees, the whilom affection having turned into hatred, they considered those peaceful settlements a fit prey for their depredations and inroads. The hatred thus nourished, by further degrees included all and everything belonging to these devastators; even their religion, originally identical with that of the settlers. The 'Deva religion' became, in their eyes, the source of all evil. Molded into a new form, styled the 'Ahura' religion, the old elements were much more changed than was the case when Judaism became Christianity. Generation after generation further added and took away, until Zarathustra, with the energy and the clear eye that belongs to exalted leaders and founders of religions, gave to that which had originally been a mere reaction and spite against the primitive 'Brahmanic' faith a new and independent life, and for ever fixed its dogmas, not a few of which sprang from his own brains.

It is chiefly from the *Gâthas* that Zarathustra's real theology, unmutilated by later ages, can be learned (see *ZEND-AVESTA*). His leading idea was monotheism. Whatever may have caused the establishment of the dualism of gods, the good and the evil, in the Persian religion—a dualism so clearly marked at the time of Isaiah the prophet that he found it necessary to protest emphatically against it—it was not Z. who proclaimed it. His dualism is of a totally



different nature. It was merely the principle of his speculative philosophy—a supposition of two primeval causes of the real and the intellectual world. His moral philosophy, on the other hand, moved in a triad—thought, word, and deed. There is no complete system of Zoroastrian philosophy in the Zend-Avesta, any more than there is a developed Platonic system laid down explicitly in the Platonic writings; but from what is to be gathered in the documents referred to, it cannot be doubted that Z. was a deep and great thinker, far above his contemporaries, and above even many of the most enlightened men of subsequent ages. If proof were needed for the high appreciation in which he was held in antiquity, it might be found in the fact, that even the Greeks and Romans, not given to overrating foreign learning and wisdom, held him in highest estimation, as may be seen by their reiterated praises of the wisdom of him whose name they scarcely knew how to pronounce.

With regard, then, to the first point, his monotheism, it suffices to mention, that while the fire-priests before him, the Soshyantôs, worshipped a plurality of good spirits called Ahuras, as opposed to the Indian devas, he reduced this plurality to a unity. This one supreme being he called Ahurô Mazdaô (that Ahura which is Mazdao), or the creator of the universe—the Auramazda of the cuneiform inscriptions of the Achemenidian kings, the Ahurmazd of Sassanian times, and the Hormazd or Ormazd of modern Parsees. This supreme god is by Z. conceived to be ‘the creator of the earthly and spiritual life, the lord of the whole universe, at whose hands are all the creatures.’ The following extract from the Gâtha (Ustavaiti) will leave no doubt on that much-contested point: ‘Blessed is he, blessed are all men to whom the living wise God of his own command should grant those two everlasting powers (viz., immortality and wholesomeness). . . . I believe Thee, O God, to be the best thing of all, the source of light for the world. Everybody shall choose Thee as the source of light, Thee, Thee, holiest spirit Mazda! Thou createst all good things by means of the power of Thy good mind at any time, and promisest us, who believe in Thee, a long life. I believe Thee to be the powerful holy god Mazda! for Thou givest with Thy hand, filled with helps, good to the pious man, as well as to the impious, by means of the warmth of the fire strengthening the good things. From this reason, the vigor of the good mind has fallen to my lot. . . . Who was in the beginning the father and the creator of truth? Who showed to the sun and the stars their way? Who causes the moon to increase and wane, if not Thou? . . . Who is holding the earth and the skies above it? Who made the waters and the trees of the field? Who is in the winds and in the storms that they so quickly run? Who is the creator of the good-minded beings, Thou wise? Who made the lights of good effect and the darkness? Who made the sleep of good effect and the activity? Who made morning, noon, and night?’ Ahuramazda is thus to Z. the light and the source of light.

He is wisdom and intellect; he possesses all good things, temporal and spiritual, among them the good mind, immortality, wholesomeness, the best truth, devotion, piety, and abundance of all earthly good. All these gifts he grants to the pious man who is pure in thought, word, and deed. He rewards the good, and punishes the wicked; and all that is created, good or evil, fortune or misfortune, is his work alone.

We spoke of Z.'s philosophical dualism, and of its having often been confounded with theological dualism. Those who deny Z.'s theological dualism insist that nothing was further from Z.'s mind than to assume more than one supreme being, one and indivisible. But that everlasting problem of all thinking minds—viz., the origin of evil, and its incompatibility with God's goodness, holiness, and justice—he attempted to solve by assuming two principles or two primeval causes (not two gods), which, though different, were united, and produced the world of the material things as well as that of the spirit. The one who produced the *reality* (gaya) is called Vohu Mano, the good mind; the other, through whom the non-reality (ajyâiti) originated, is the Akem Manô, the naught mind. To the first belong all good, true, and perfect things; to the second, all that is delusive, bad, wicked. These two aboriginal moving causes of the universe are called twins. They are spread everywhere, in God as in men. When united in Ahuramazda, they are called Cpentô Mainyus, and Angrô Mainyus—i.e., white or holy; and dark spirit. It is asserted further that only in later writings are these two supposed to be opposed to each other, then viewed as no longer within Ahuramazda, but without—standing, in fact, in the relation of God and Devil to each other. The inscriptions of Darius know but one god, without any adversary whatsoever; but while the one side within this Divine One produced all that is bright and shining, all that is good and useful in nature, the other side produced all that is dark and apparently noxious. Both are as inseparable as day and night, and, though opposed to each other, are indispensable for the preservation of creation. The bright spirit appears in the blazing flame, the presence of the dark is marked by the wood converted into charcoal. The one has created the light of the day, the other the darkness of night; the former awakens men to their duty, the other lulls them to sleep. Life is produced by the one, and extinguished by the other, who also, by releasing the soul from the fetters of the body, enables the soul to ascend to immortality and everlasting life.

Whether or not this view of Z.'s monotheism can be sustained as against the usual view which attributes dualism to him, it is certain that the original monotheism of Z. did not last long. False interpretations, misunderstandings, changes, and corruptions crept in, and dualism was established in theology. The two principles then for the first time became two powers, hostile to each other, each ruling over a realm of his own, and constantly endeavoring to overthrow the other. When this doctrine, which appears



fully developed first in the Vendidad, had once been accepted by some of the most influential leaders, it soon followed that, like terrestrial rulers, each of the two powers must have a council and a court of his own. The number of councilors was six, each having to rule over some special province of creation; but Ahuramazda, who at first merely presided over this council, came gradually to be included in their number; and we then read of seven instead of the usual six Ameshaspentas, or Immortal Saints. These six supreme councilors, who have found their way also into the Jewish tradition embodied in the Talmud, are both by etymology and by the sense of the passages in which they figure distinctly seen to be but abstract nouns or ideas, representing the gifts which God grants to all those who worship with a pure heart, who speak the truth and perform good actions. The first of these angels or principles (Vohu Mano) is the vital faculty in all living beings of the good creation. He is the *son* of Ahuramazda, and penetrates the whole living good creation: by him are wrought all good deeds and words of men. The second (Ardibehesht) represents the blazing flame of fire, the light in luminaries, and brightness and splendor of any and every kind. He represents, as the light, the all-pervading, all-penetrating Ahuramazda's omnipresence: he is the preserver of the vitality of all life and all that is good; and thus represents Providence. The third presides over metals, and is the giver of wealth: his name is Sharavar, which means possession, wealth. The fourth (Issandarmat = Devotion) represents the earth: it is a symbol of the pious and obedient heart of the true Ahuramazda worshipper, who serves God with his body and soul. The two last (Khordâd and Amerdât) preside over vegetation, and produce all kinds of fruit. But apart from the celestial council stands Sraosha (Serost) the archangel, vested with very high powers: he alone seems to have been considered a personality. He stands between God and man, the great teacher of the prophet himself: he shows the way to heaven, and pronounces judgment on human action after death. He is, in the Yazna, styled the Sincere, the Beautiful, the Victorious, who protects our territories, the True, the Master of Truth. 'For his splendor and beauty, for his power and victory,' he is to be worshipped and invoked. 'He first sang the five Gâthas of Zarathustra Spitama;' that is, he is the bearer and representative of the sacred tradition, including the sacrificial rites and the prayers. He is the protector of all creation, for 'he slays the demon of Destruction, who prevents the growth of nature, and murders its life. He never slumbers, but is always awake. He guards with his drawn sword the whole world against the attacks of the demons, endowed with bodies after sunset. He has a palace of 1,000 pillars, erected on the highest summit of the mountain Alborj. It has its own light from inside, and from outside it is decorated with stars. . . . He walks teaching religion round about the world.' In men who do not honor him by prayer, the bad mind becomes powerful, and impregnates them with sin and crime,

and they shall become utterly distressed both in this life and in the life to come.

In the same manner as Ahuramazda, his counterpart, Angrômainyus, was in later times endowed with a council, imitated from the one above mentioned, and consisting of six devas, or devils, headed by Angrômainyus himself, who is then styled Devânam Devo = arch-devil. The first after him is called Ako Mano, or Naught Mind, the original 'non-reality,' or evil principle of Zoroaster: he produces all bad thoughts, makes man utter bad words, and commit sin. The second place is taken by the Indian god Indra; the third, by Shiva or Shaurva; the fourth, by Nāonhaitya—the collective name of the Indian Ashuras or Dioscuri; the fifth and sixth, by the two personifications of 'Darkness' and 'Poison.' There are many devas, or devils, besides found in the Zend-Avesta, mostly allegorical or symbolical names of evils of all kinds. While the heavenly council is always taking measures for promoting life, the infernal council is always endeavoring to destroy it. They endeavor to spread lies and falsehoods, and altogether with their great chief correspond with the devil and the infernal hierarchy of the New Testament.

Thus Monotheism was in later times broken up and superseded by Dualism. But a small party, represented by the Magi, remained steadfast to the old doctrine, as opposed to that of the followers of the false interpretation or Zend, the Zendiks. In order to prove their own interpretation of Zoroaster's doctrines, they had recourse to a false and ungrammatical explanation of the term Zervana Akarana, which, meaning merely time without bounds, was by them pressed into an identity with the Supreme Being; while the passages on which the present Desturs, or Parsee priests, still rest their faulty interpretation, simply indicate that God created in the boundless time, i.e., that He is from eternity, self-existing, neither born nor created. Two intellects and two lives are further mentioned in the Zend-Avesta. By the former are to be understood the heavenly, spiritual wisdom, and the earthly wisdom, i.e., that which is learned by ordinary teaching and experience. The two lives are in the same manner distinguished as the bodily and the mental, i.e., body and soul. From these two lives, however, are to be distinguished the 'first' and 'last' lives, terms which refer to this life and the life to come. The belief in the latter, and in immortality, was one of the principal dogmas of Z., and it is held by many that it was not through Persian influence that it became a Jewish and a Christian dogma. Heaven is called the 'House of Hymns,' a place where angels praise God incessantly in song. It is also called the 'Best Life,' or Paradise. 'Hell' is called the House of Destruction. It is the abode chiefly of the priests of the bad (deva) religion. The modern Persians call the former Behesht; the latter, Duzak. Between heaven and hell there is the bridge of the gatherer or Judge, over which the soul of the pious passes unharmed, while the wicked is precipitated from it into hell. The resurrection of the body is clearly and emphatically



indicated in the Zend-Avesta; and it belongs, in all probability, to Z.'s original doctrine—not, as has been held by some, to later times, when it was imported into his religion by other religions. A detailed description of the resurrection and last judgment is in the Bundeshesh. The same argument—the almightiness of the Creator—which is now employed in a crude interpretation of the Christian doctrine of the resurrection, to show the possibility of the elements, dissolved and scattered as they may be, being all brought back again, and made once more to form the body to which they once belonged, is used in the Bundeshesh to prove the Resurrection. There is still an important element to be noticed—viz., the Messiah, or Sosiosh, from whom the Jewish and Christian notions of a Messiah are held, by many, to have been derived. He is to awaken the dead bodies, to restore all life destroyed by death, and to hold the last judgment. Here, again, a later period introduced a plurality, notably a Trinity. Three great prophets are also to appear when the end of the world draws nigh, respectively bearing the names of Moon of Happy Rule, Aurora of Happy Rule, and Sosiosh, who is supposed to be the son of Zarathustra, begotten in a supernatural way; and he will bring with him a new portion of Zend-Avesta, hitherto hidden from man. Even a superficial glance at this sketch will show our readers what parallels between Jewish and Christian notions on the one hand, and the Zoroastrian on the other, are to be drawn; but, as we have noticed under PARSEE (q.v.), an attentive reading of the Zend-Avesta reveals many new and striking points of contact.

We have in the foregoing sketch mainly followed Haug, the *facile princeps* of Zend studies in these days; but we have taken into account also the views of Windischmann, Spiegel, and other prominent investigators, and principally by quoting the words of the sacred sources themselves, when feasible, put our readers in a position to judge on the main points for themselves. We cannot, however, do better than thus briefly summarize, in conclusion, the principal doctrines of Z., as drawn from a certain speech (contained in the Gâthas), which, probably, emanates from Z. himself.

‘1. Everywhere in the world a duality is to be perceived such as the Good and the Evil, light and darkness; this life and that life, human wisdom and divine wisdom. 2. Only this life becomes a prey of death, but not that hereafter, over which the destructive spirit has no power. 3. In the universe there are from the beginning two spirits at work, the one making life, the other destroying it. 4. Both these spirits are accompanied by intellectual powers, representing the ideas of the Platonic system on which the whole moral world rests. They cause the struggle between good and evil, and all the conflicts in the world, which end in the final victory of the good principle. 5. The principal duty of man in this life is to obey the word and commandments of God. 6. Disobedience is punished with the death of the sinner. 7. Ahuramazda

created the idea of the good, but is not identical with it: this idea produced the good mind, the Divine Spirit working in man and nature, and devotion—the obedient heart. 8. The Divine Spirit cannot be resisted. 9. Those who obey the word of God will be free from all defects, and immortal. 10. God exercises his rule in the world through the works prompted by the Divine Spirit, who is working in man and nature. 11. Men should pray to God and worship him. He hears the prayers of the good. 12. All men live solely through the bounty of God. 13. The soul of the pure will hereafter enjoy everlasting life; that of the wicked will have to undergo everlasting punishment—i.e., as modern Parsee theologians explain, to the day of the resurrection. 14. All creatures are Ahuramazda's. 15. He is the reality of the good mind, word, and deed.'—See PARSEE: GUEBRES: ZEND: ZEND-AVESTA: ETC.

ZOROASTRIAN, a. *zō'rō-ās'trī-an*: of or pertaining to Zoroaster. ZO'ROAS'TRIANISM, n.: system of Zoroaster (q.v.).

ZOSIMUS, *zōs'ī-mūs*, Pope of Rome: Greek by birth (pope 417, Mar. 1—418, Dec. 25); d. 418, Dec. 25. He was successor of Innocent I. He is notable as connected with the history of the heresiarch Pelagius (q.v.). The African bishops had condemned the opinions of Pelagius, and this judgment had been ratified by Pope Innocent. In the interval, however, Pelagius appealed to the pope; and his disciple, Celestius, came in person to Rome, where he presented a confession of faith in his own justification. Z., having convened a council of bishops and submitted this to them, was induced by the specious explanations of Celestius to suspend the judgment, and even to write to the African bishops, recommending a reconsideration of the case. This apparent conflict of Z. with his predecessor, though it has been used by the Gallican as well as Prot controversialists as an argument against papal infallibility, was nevertheless only temporary. On further examination of Celestius, Z. became sensible that he had been deceived; and even before the reply of the African bishops, he confirmed and renewed their original condemnation of the Pelagian doctrine. His Letters, curious and interesting, are in Constant's *Epistolæ Romanorum Pontificum*.

ZOSIMUS, *zōs'ī-mūs*, of Constantinople: Greek historian in the first half of the 5th c. Of his personal history nothing is known. He wrote the History of the Roman Emperors, in six books, from Augustus to A. D. 410. The work is mainly a compilation from previous writers. His style is concise, clear, and interesting. He seeks to unfold the causes of the decline of the empire, and being himself a pagan, he adduces as the chief, the neglect of the pagan religion which attended the progress of Christianity. The unsparing severity with which he assails various Christian emperors, especially Constantine, has been considered to detract from his credibility as a historian. From his own point of view, he shows considerable acuteness in his remarks.

ZOSTER: see HERPES.



## ZOSTERA—ZOUAVE.

**ZOSTERA**, n. *zōs'tēr-a* [Gr. *zōstēr*, a girdle—so called from the appearance of their leaves]: a genus of water or sea plants, ord. *Naiadacēæ* (see GRASSWRACK).

**ZOTHECA**, n. *zō-thē'ka* [Gr. *zōthēkē*]: in *anc. arch.*, a small compartment or alcove, which might be separated from an adjoining compartment by a curtain.

**ZOUAVE**, n. *zoāv* or *zōāv* [F.—from an Algerian tribe]: one of a celebrated body of French infantry, chiefly raised in Africa. The Zouaves derive their name from a tribe of Kabyles, inhabiting the mountains of Jurjura, in the Algerian province of Constantine. Long previous to the invasion of Algiers by the French, these Kabyles had been employed as hired mercenaries in the service of the rulers of Tripoli, Tunis, and Algiers; and after the conquest of the last-named country 1830, the French, in the hope of establishing a friendly feeling between the natives and their conquerors, took the late Dey's mercenaries into their service, giving them a new organization. Accordingly, Gen. Clausel created, 1830, two battalions of Z., in which each company consisted of French and Kabyles in certain proportions, officers, subalterns, and soldiers being selected from either race; the Z., though retaining their Moorish dress, were armed and disciplined after the European fashion; and the battalions were recruited by voluntary enlistment. As it was soon found, however, that the system of commingling the two races did not effect the object intended, the French and Kabyles were formed into separate companies; and in 1837 they were divided into three battalions, and put under the command of a colonel. Their first col. was Lamoricière, who mainly effected their reorganization, and under whom, as well as his successor, Cavaignac (q.v.), they distinguished themselves in many a bloody conflict with the Arabs of the south. Gradually, however, the native element was eliminated, and since 1840 they have been virtually French troops in Moorish dress. Their numbers were greatly augmented 1852-55, and they now amount to more than 10,000 men, divided into four regts. of four battalions each. They are recruited from the veterans of the ordinary infantry regts. who are distinguished for their fine 'physique' and tried courage and hardihood; clad in a loose jacket and waistcoat of dark-blue cloth ornamented with yellow braid, loose madder colored trousers, brown cloak, madder-colored Fez cap with a yellow tassel, surrounded by a green turban, a light blue sash of wool, yellow leather leggings, and white gaiters; and armed with a carbine and sword-bayonet. The uniform of the officers and subalterns is the same as that of the hussars.

When the French and the African elements of the original Zouave battalions were separated, the Africans were constituted into a separate body, under the name of Algerian Tirailleurs, a force still recruited in Algiers to form a part (three regiments) of the regular French army. They are better known as *Turcos*.—At the outbreak of the civil war in the United States, a regt. in Zouave uniform was raised by Ephraim E. Ellsworth (q.v.).

ZOUNDS, int. *zounds* [contr. of *by God's wounds*]: an old form of oath, expressive of anger or wonder.

ZOUTCH, v. *zowtch* [etym. doubt.]: to stew, as flounders, whittings, gudgeons, eels, etc., with just enough liquid to cover them.

ZSCHOKKE, *tschölk'kéh*, JOHANN HEINRICH DANIEL: German author: 1771, Mar. 22—1848, June 27; b. Magdeburg. Leaving school at the age of 17, he joined a company of players in the capacity of a dramatic author; and after travelling with them for some time, he returned to his family, and entered the Univ. of Frankfurt. There he seems to have studied all subjects from divinity to administration (*Kameralwissenschaften*). He at the same time acted as a private teacher, and published plays which brought him reputation, but no money. In 1795 he was disappointed in obtaining the post of ordinary prof., for which he applied, and set out on a tour through Germany and France. He settled finally at Reichenau, in the Grisons, where he opened a boarding-school. So much pleased were the governing bodies of the canton with his establishment, that they presented him with the citizenship. In return for this favor, he wrote a history of the Grisons, pub. Zürich 1798 (*Geschichte des Freistaats der drei Bünde in Rhätien*). In the same year, however, Z. became unpopular in the canton by advocating its annexation to the Helvetic Republic established by the French, and his school was in consequence closed. He removed to Aarau, then the seat of govt., where he was employed as a commissioner to settle the affairs of Unterwalden, Uri, Schwyz, and Zug, a trust which he discharged with the utmost ability and good temper. The benevolent interest, indeed, which he manifested in the sufferings of the population has made his name memorable as a national benefactor. It would be tedious to enumerate the political and administrative affairs in which Z. was actively engaged after this period; we find him at one time protesting against the arbitrary proceedings of the French, and at another pointing out the prudence of concession, but always taking a course marked by practical sagacity and wisdom. In 1804 he was presented with the citizenship of Aargau and appointed inspector of woods and mines. In the same year he founded the *Swiss Messenger* (*Schweizerboten*), a publication which rapidly became popular. It was followed by the *Miscellany of the Latest News* (*Miscellen für die neueste Weltkunde*), which was continued till 1813. In 1811 he added a monthly periodical, the *Erheiterungen*, to these publications. He died at Aarau. Z.'s works are very numerous; and are characterized by sound information, good sense, and vigorous eloquence. The most important of his historical works not mentioned above are *History of the Forest Cantons*, a *History of Bavaria*, a *Popular History of Switzerland*. His novels or tales are more numerous and better known; among the best are *The Creole*, *Alamontade*, *Jonathan Frock*, *Clementine*, *Oswald*, and *Meister Jordan*. As poet and play-writer Z. has less merit. The most popular of all his writings was the *Hours of Devotion*, a Sunday periodical: it supplied a com-



## ZSCHOPPAU—ZUIDER ZEE.

plete exposition of modern rationalism, and yet displayed such zeal and eloquence in the cause of sound morality that it met with approbation from persons of all creeds. It has gone through 40 German editions, and, with many other works of Z., has been translated into English. There are many editions of his works (one of 40 vols. 1854). See *Life* by Münch (1831), and by E. Zschokke (3d ed. 1875).

**ZSCHOPPAU**, *tschöp'pow*: town of Saxony, circle of Zwickau; about 26 m. e. of the town of Zwickau, on the river Zschoppau. It has a castle and two churches; manufactures of hosiery, cloth, lace, etc.; weaving, wool-spinning, dye-works, bleach-fields. Pop. about 8,000.

**ZUCHETTA**, n. *tsô-kêt'tâ* [It. *zucchetta*, a small gourd, anything resembling a gourd in shape—from *zucca*, a gourd]: in *Rom. Cath. ritual*, the skull-cap of an ecclesiastic, covering the tonsure. That of a priest is black, of a bishop or monsignor purple, of a cardinal red, and of the pope white.

**ZUFFOLO**, n. *zôf'fô-lô*, or **ZUFOLO**, n. *zô'fô-lô* [It. *zufola*—from *zufolare*, to hiss or whistle]: a small flute or flageolet, especially one used to teach birds.

**ZUG**, *zôg*: smallest of the Swiss cantons; whose s.e. part borders on the Alpine region and is hilly and pastoral—the n.w. part sloping to the plain of Switzerland and inclosing a great part of the Lake of Zug; about 14 m. long by 10 wide; 92 sq. m. The s.e. part is a rich and beautiful country of corn-fields and orchards. The chief exports of Z. are dried fruit, cattle, and products of the dairy. Z. is a representative democracy, all citizens above the age of 19 having the franchise. There are two councils—one legislative, of 67 members; and another, of 11 members, administrative. The inhabitants speak Swiss-German and are Rom. Catholics. The battle of Morgarten, which founded the independence of Switzerland, was fought on the frontier of this canton 1315; but it was not till 1352 that Z. joined the Swiss Confederation.—Zug, capital of the canton, has a pop. of about 5,000.—Pop. (1870) 20,993; (1880) 22,994; (1888) 23,029; (1900) 25,093.

**ZUIDER ZEE**, *zî'dér zê*, Dut. *zoy'dér zâ*: large gulf penetrating far into the Netherlands; 52° 26'—53° 20' n. lat.; about 60 m. long, and 210 m. in circumference. The islands Texel, Vlieland, Ter Schelling, Ameland, and Schiermonnikoog, reaching in a chain from the most northern point of Holland, are the remains of the former line of coast, which form a breakwater against the North Sea. From Dunkirk in French Flanders to n. Holland, the interior is defended from the sea by sand-hills or downs. Here, as at the mouth of the Scheldt, the sand-barrier was broken, and the waters overflowing the lowlands separated the province of Friesland from the peninsula of North Holland, and, having united with the small inner lake Flevo, formed the present Zuider Zee. The decisive inundation occurred 1282.

In the Z. Z. lie the islands Wieringen, Urk, Schokland, and Marken; pop. about 5,000. Fishing is the principal

## ZUKERTORT.

industry. The light-tower, on the e. point of Marken, is in  $52^{\circ} 27' 37''$  n. lat. The inhabitants are a hardy, industrious, and independent people, who live by fishing and exporting meadow-hay. They cling tenaciously to their old customs, and marry only among themselves. The houses are built on artificial mounds, or 'hills of refuge;' and, the island being liable to frequent and heavy floods, few cows or sheep are kept, no gardens or trees planted, almost all necessities of life being brought from the mainland.

From the s.e. of the Z. Z., a long narrow arm, called the *Y* (pronounced *I*), formerly extended nearly due w., through the peninsula of Holland. A strong sea-dike and locks have been constructed to cut off the Z. Z. from the *Y*; and through the *Y* a broad ship-canal has been made between Amsterdam and the North Sea, on which sea is a new harbor. On both sides of this new canal, the *Y* has been drained and turned into about 12,000 acres of rich land. The new water-way was formally opened by the king 1876. It is proposed to make a dike from the mouth of the *Yssel* to Enkhuisen, and drain the central part of the Z. Z., making room for 200,000 inhabitants, and adding nearly 500,000 acres to the arable land of the Netherlands.

ZUKERTORT, *tsúk'ér-tort*, Dr. J. H.: chess-player and chess-editor: 1842–1888, June 20; b. Riga, Russia. He was remarkable for his ability to play several games simultaneously while blindfolded. Educated at Breslau and Berlin, he edited the *Chess Journal* at Berlin 1867–71; went to London 1872, and there from 1880 edited the *Chess Monthly*. He took the first prize in the international tournament at Paris 1878. In 1883 he defeated Steinitz at a similar contest in London, but the latter was successful over him in a series of games in New York, St. Louis, and New Orleans, 1886.



## ZULULAND.

ZULULAND, *z'ó-ló-land*: region in s. Africa, n.e. of the colony of Natal, between its e. boundary, the Tugela and Umzimyati rivers, and Delagoa Bay; inhabited chiefly by tribes of Zulu Kafirs. The great coast chain of mountains, which form in the Cape Colony the Stormbergen, and further n.e. the Kahlamba and Drachenbergen, still continue well-defined to the n.e., running parallel to the coast, but 120 m. distant from it, separating the coast region of Z. from the higher plateaux of the Transvaal, and rising to an average height of 6,000 or 7,000 ft. E. of the Tugela river, the country spreads out into large undulating, grassy plains, but sparsely wooded; while toward the foot of the mountains the kloofs afford some excellent timber. The principal rivers are the Umvoluzi or St. Lucia river, which enters the sea about 80 m. n.e. of the Natal frontier; and the Mapoota and its branches, which drain the n. part of the region and fall into Delagoa Bay. The country along the coast between the St. Lucia river and Delagoa Bay is very flat, marshy, and unhealthful. A considerable range of mountains, called the Lebombo, runs from the Umvoluzi river almost northerly to beyond Delagoa Bay, about half-way between the coast and the first range above mentioned, forming a supporting buttress to a plateau of high level, like those common in the Cape Colony and Natal.

This is generally a fertile region, and, as far as the coast-line, is healthful. Sugar, cotton, and other tropical products can be grown as advantageously as in the Natal colony, to which it forms an intermediary link between the fever-regions of the e. coast and the more healthful climate of Natal and the Cape Colony. The St. Lucia river marks the boundary-line beyond which, to the n.e., the Europeans cannot permanently live. Up till the outbreak of the war in 1879, no good map of the Zulu country existed, and even yet little is known of its geology or mineral productions. None of the rivers are available for inland navigation, though a large lagoon inside the mouth of the St. Lucia river can be ascended for a few miles. The rivers which flow into Delagoa Bay from the n. are sluggish, often with no perceptible current, and can be ascended a considerable distance. Ivory, rhinoceros's horns, hides, etc., are collected in large quantity in this region by traders from Natal; and cattle, Indian corn, etc., thrive well in the country outside the swampy region. The principal tribes all are of the Zulu race—the Amazulu inhabiting the region bordering on Natal; the Amahute, Amazwazi, etc., the country in the neighborhood of Delagoa Bay. The Portuguese have a very decayed fort and settlement on Delagoa Bay, garrisoned by a few mulatto soldiers, and carrying on some trade with the natives and Dutch Boers in gunpowder, muskets, calico, etc., in exchange for ivory, horns, and other native produce; and a contraband trade in slaves is also (it is believed) winked at by the authorities, as captures are often made along the coast by British cruisers. The Dutch emigrant Boers, who very much required a port on the sea-board of s.e. Africa, would long since have

## ZULULAND.

seized on Delagoa Bay, but for their dread of the very unhealthful climate, which affects them more than it does Europeans or N. Americans. Z. was made a province and annexed to Natal 1897, Dec. 30.

ZULU, *zô'lo*, or AMAZULU, *â-ma-zô'lo*, is the name of that portion of the Kafir or Kaffir race who inhabit Natal and the region n.e. of it, until they gradually merge into the mere negro of the e. coast, n. of the Zambesi (see KAFIRS). The Kafir organization appears to hold an intermediate place between that of the negro and a higher type; and as we go s. and w. from the swamps and malaria of Delagoa Bay and Sofala to the more healthful and bracing regions of Natal and Independent Kaffraria, the Kafir features appear to grow more refined—the mouth protrudes less, the lips are less thick, and the nose assimilates more to that of the European, though the distinguishing type of woolly hair may continue.

The Z. Kafir is a far more amiable savage than his brother the Amakosa of the Cape frontier districts. He is less warlike and predatory, more industrious, and far more willing to act in the capacity of a farm-laborer or domestic servant. In language, customs, habits, etc., though certain tribal and local differences occur, yet they may be called common to all the nation, as a Z. Kafir has no difficulty in understanding a native of British Kaffraria; and his views of a future state, purchase of wives, etc., are similar. The Z. is by nature social, light of heart, and cheerful; his affections are gentle, steady, and enduring; his passions are, however, strong, and are called into activity by war. He is comparatively chaste; crimes which stain European or Eastern civilization are unknown to him. He is hospitable and honest, yet greedy and stingy; he is kind to his own family, yet cruel to dumb animals; and whatever the better nature of his impulses may be, yet when his great chief commands war, he is converted into a demon. He is proud, and very easily can distinguish between an English gentleman and one of the tribes of idlers found in many British colonies. The individuals of the Kafir race are capable of the utmost devotion under kindness and firmness of treatment. Their reasoning powers are good, and with an improved education, a Z. rationalist might not disgrace a chair in the Sorbonne.

It is from the Z. country, however, that those terrible tyrants who so long devastated s.e. Africa, the chiefs Chaka, Dingaan, Moselikatze, etc., issued. The training of their subjects to a peculiar mode of warfare spread desolation and havoc for many years among the Betjuana and other tribes of the interior; until eventually these mighty chiefs with their thousands of followers, fighting, like Homer's heroes, hand to hand, armed with stabbing assagais and shields of ox-hide, the colors of which distinguished their different regiments, melted away with broken power into insignificance before the terrible rifles of a few hundred emigrant Dutch Boers, who, in their turn, gave way to the energetic action of the British authorities (see NATAL). The Zulus, though they have very often serious



intestine wars among themselves, have generally lived on friendly terms with the Natal colonists. That their warlike qualities have not decayed was sufficiently shown in the war in 1879 between England and Ketchwayo (Cetewayo), the Zulu king. This unprovoked war was precipitated by the arrogant plan of a 'high commissioner, Sir Bartle Frere, who had determined upon measures for remodelling the Zulu nation' by breaking it up into tribes with each a chief. This striking instance of civilized aggression met at first a brave repulse: within a week or two after the British forces crossed the Natal frontier, the Zulus inflicted a severe blow on the invaders by surrounding a camp at Isandhlwana and annihilating the defenders. The Zulus also repulsed several attacks on their strongholds; but, after the British had received reinforcements, they were defeated at Ginghilovo, and completely broken by Lord Chelmsford at Ulundi. The king was captured shortly afterward, and deported to Cape Town. The Zulu country was divided among 12 chiefs. But in 1883 Ketchwayo was reinstated in the central portion of his kingdom, with an English resident. The n.e. part was put under an independent chief; and on the s., adjoining the Natal border, another strip of territory was reserved for the chiefs unwilling to come again under Ketchwayo's authority (one of whom, John Dunn, is of English blood). Ketchwayo, vanquished by a rival, died a fugitive 1884.

Several missionary societies (Wesleyan, Anglican, American, and Norwegian) labor regularly among these tribes. Considerable interest was some time ago aroused by Bp. Colenso's peculiar views as to evangelizing these heathens; and Colenso's Zulu was for a while almost as famous as Macaulay's New Zealander.

The Amafengu tribe, now settled along the Cape frontier, are a broken tribe of Zulus, driven far to the s.w. by Chaka or Dingaan, then reduced to slavery by the Amakosa Kafirs, and freed by Sir B. Durban in the Kafir war of 1834-5. The principal Z. tribes are the Amazulu, the Amahute, Amazwazi, and Amatabele. The last emigrated far northward to the mountains which separate the basins of the Limpopo and Zambesi.

ZUMALA-CARREGUY, *thô-mâ'lâ-kâr-râ'gê*, Don TOMAS: most distinguished of the generals who supported the cause of Don Carlos during the Spanish civil war (1833-40): 1789-1835; b. at Ormaiztegua, in the Biscayan province of Guipuzcoa; of aristocratic though not wealthy family. He was deeply imbued from infancy with royalist sentiments, which gathered strength with increasing years, till they led him, like the Vendean leaders, to sacrifice fortune and life for a prince wholly unworthy of such devotion. At the time of the invasion of the Peninsula by Napoleon, Z. was a student of law at Pampeluna, and, like many of the Spanish youth, he deserted his studies to take up arms against the invader, serving in Mina's corps till the close of the war. He afterward served under Quesada in the 'Army of the Faith;' and on the re-establishment of absolutism was raised to the rank of col., and

## ZUMBOORUK—ZUMPT.

appointed gov. of Ferrol. He showed excellent administrative qualities; but his decided leaning to the party of the Carlists (though he repelled, indignantly all proposals to proclaim Don Carlos king during the life of Ferdinand VII.) becoming known, he was tried by a council of war, and acquitted. In 1832, when the army was purged of all officers suspected of Carlism, Z. was dismissed, and retired to Pampeluna, where he lived in retirement till the death of Ferdinand and the rising of the Basque population called him to head the Carlist insurrection (1833, Oct. 11). His motley army was without uniform, ill fed, and ill paid; yet the profound esteem in which 'el Tio Tomas' was held by his followers enabled him to maintain effective discipline. The overwhelming superiority in number of the Christinos, however, forced him to adopt a defensive system of tactics; so, holding the command of Biscay and Navarre, and the strongholds of Fuenterrabia and Irun, to assure his retreat into France, if necessary, he kept his opponents at bay, defeated Rodil in the valley of Amescoas (1834, Aug. 1), routed another force of Christinos at Viana (Sep. 7), gained a second victory in the Amescoas valley in the following spring, completely defeating Valdez, after a battle of four days, and routed Iriarte near Guernica. These brilliant successes of his skilful and devoted partisan flattered the too sanguine and somewhat weak-minded Don Carlos with the hope of speedily seating himself on the throne, rendered him less willing than formerly to be guided by the counsels of Z., and led him to interfere with the latter's schemes, to his own detriment. Accordingly, after another year's successful fighting with the Christinos, Z. was ordered to lay siege to Bilbao; where, 1835, June 15, he received a gunshot wound from which he died ten days afterward. With Z.'s death all hope of success for the Carlists was extinguished; and though the war dragged on desultorily for some years, the result was never doubtful. Z. was as distinguished for generosity and disinterestedness as for fidelity; and so much had he impoverished himself by liberality to his soldiers, that neither his wardrobe nor his treasury supplied the means for his decent interment.—See Henningsen's *Twelve Months' Campaign with Zumala-Carreguy in Navarre and the Basque Provinces* (2 vols. Lond. 1836).

**ZUMBOORUK**, n. *zŭm-bŏ'rŭk*: in the *East*, a small swivel-gun, larger than a gingal, carried on the back of a camel, from which it is fired.

**ZUMIC**: see **ZYMIC**.

**ZUMOLOGY**: see **ZYMOLOGY**.

**ZUMPT**, *tsŭmpt*, **KARL GOTTLOB**: German classical scholar: 1792, Mar. 20—1849, June 25; b. Berlin. He studied at Heidelberg and Berlin, and 1827 became prof. of Roman literature at the Univ. of Berlin. Besides editing Latin authors, he published a Latin grammar, still used in its Eng. translation; also many essays, such as *Annales Veterum Regnorum et Populorum, imprimis Romanorum* (1819); *Ueber den römischen Ritterstand* (1839); *Ueber den*



## ZUNDERERZ--ZUNI INDIANS.

*Stand der Bevölkerung und die Volksvermehrung im Alterthum* (1841); and *Ueber die bauliche Einrichtung des römischen Wohnhauses* (1844).—His nephew, AUGUST WILHELM Z., b. 1815, Dec. 4, was prof. in the Friedrich-Wilhelm Gymnasium of Berlin, and published a number of works, including one in 4 vols. on the criminal law of the Roman republic (1865-68).

ZUNDERERZ, n. zǎn'dér-êrz [Ger.]: tinder ore; an ore of antimony occurring in soft, flexible, tinder-like masses, of a blackish-red color.

ZUNI INDIANS, zō'nyē: tribe of Pueblo Indians in e. Arizona and w. New Mexico. They call themselves A-shi-wi, or Shi-wi-nas, the name referring to their tribal emblem, 'the sacred water-spider.' They are the most interesting of the tribes dwelling in pueblos (piles of adobe or stone buildings), because most isolated and therefore retaining their primitive condition; and because their peculiarities were fully studied by Frank H. Cushing, who (about 1880) lived among them three years. The chief pueblo, and larger than any other now inhabited in N. America, is known as Zuni; it is in a valley high upon the w. slope of the Sierra Madre, 10 m. e. of the Arizona line, and 30 m. s. of Fort Wingate. It has about 1,500 inhabitants, and consists of a mass of apartments, 1 to 5 stories high, and built in part of red sandstone, in part of adobe made from red clay—the upper stories as usual reached by outside ladders, up which women walk erect with jars of water on their heads, and young children and even dogs easily climb. Some of the rooms are 20 x 40 ft., the ceilings 8 ft. high and made of beams. Meal is ground with stones in stone troughs. 'Paper bread,' so called, is dough baked by rolling out quickly on a hot slab of stone; and roasted locusts and mutton broth are favorite food. Pottery of all sorts, burned in kilns, is still a flourishing art. Monogamy prevails; and the residence apartment is owned by the wife, who, if she wills, can drive the husband away. Outside of the pueblo is a large well, with steps leading to the water; also separate family gardens in one common inclosure, where onions and herbs are cultivated. The men in summer cultivate wheat, barley, and corn in fields, sometimes 5-30 m. distant, and without irrigation; the corn is planted deep, and grows very low, the ears ripening close to the ground. Cattle, horses, sheep, and pigs are owned; eagles are reared for their feathers. There are peach-orchards, traceable probably to Spanish introduction. There are some smaller inhabited pueblos of this tribe, and extensive ruins of others. The Spaniards first visited the region 1551, and Coronado described 7 cities of 'Cibola,' which, it is thought, have been now identified. The Z. have a governor of their own, administering a kind of patriarchal authority; a high-priest; and 13 wise men, 'caciques,' who make the laws. The worship is directed much to the sun and to water; also to animals, as being near to man, yet mysterious, and mediating between him and the more mysterious elements and higher powers. The most special fetiches are things in nature that have an accidental resemblance to

## ZURBARAN—ZÜRICH.

animals, explained in a legendary way. There are two evil spirits, one malicious, the other evil through blundering ignorance. The Z. have a saga, 'perfect in rhyme and rhythm,' of four parts, each with four subdivisions, repeated at stated times, by persons trained to learn it, and occupying two evenings for the rehearsal. It treats of creation, of a world once covered with water, and of all the history of the people. It speaks of their original home as by the sea, perhaps the Pacific. In 1882 a deputation went to get some of the 'sacred water' of the Atlantic, guided by Mr. Cushing. Their language is described as high in grammatical structure, and they have also a dead language of their own, preserved by a few. Their festivals, dances, and other observances have more or less resemblance to those of other Indians. Their numbers have greatly decreased, especially by such contagious diseases as small-pox; and in some respects they differ from other communal tribes—e. g., they are not even nominally Rom. Catholic, like the Moquis in n. Arizona, though there is the ruin of a church near Zuni. See PUEBLO INDIANS.

**ZURBARAN**, *thór-bá-rán'*, FRANCISCO: Spanish painter: 1598, Nov.—1662. He was a pupil of Juan de Roelas, but painted in the style of Caravaggio. His most famous work is *St. Thomas Aquinas Ascending into Heaven*. Other works of repute by him are a series representing the life of St. Peter, executed for the Seville cathedral, and another series illustrating the life of St. Jerome, in a monastery of Guadalupe. His works were numerous, and he was appointed painter to the king 1650. He was a contemporary of the celebrated Spanish painters, Spagnoletto, Velasquez, Cano, and Murillo.

**ZÜRICH**, *zū'rik*, Ger. *tsü'rīch*: canton on the n.e. frontier of Switzerland, ranking as the first in importance. It extends from the Lake of Z. to the Rhine, and is of very irregular outline, being simply the lands conquered by the city of Z.; about 656 sq. m. It is drained by the Rhine and its tributaries, and is traversed by ridges of lofty hills, running n.w. and s.e., between which lie three valleys, forming almost its whole surface—those of the Toss, the Glatt, and the Limmat. The Lake of Z. penetrates Z. 26 m., and connects it with the cantons of Schwyz and St. Gall. Z. has not a fertile soil, but it is carefully cultivated. Considerable grain is raised in the canton, though not enough to supply the wants of the population. Vineyards and orchards are numerous; but the pasture-lands are of much greater importance, and cattle form the chief wealth of the agricultural population. Z. was one of the earliest seats of the cotton manufacture in Europe, and the spinning and weaving of cotton are still prosecuted with great success. The silk manufactures are nearly as important; and recently the progress in manufacture of railway locomotives and other machinery has occasioned some disquiet to English engineers. The mechanics of Z. divide their attention between agriculture and manufacturing industry, and are among the most prosperous and best educated working-men in Europe. The govt. of the can-



## ZÜRICH.

ton is a representative democracy—all adult citizens of 20 enjoying the franchise. The great council of Z. is elected chiefly by the citizens, but partly also by its own members. It appoints for four years an executive council of 9 members. A desire to give a yet more thoroughly democratic character to the constitution led to the appointment 1868 of a committee to consider its revision; and now the real decision as to laws, taxes, etc., lies with the people. Z. returns 14 members to the national council. The pop. of the canton is German-speaking and mostly Protestant. Pop. (1880) 317,576; (1900) 431,036.

ZU'RICH: city, cap. of the canton of Z., and till 1848 virtually cap. of the Swiss Confederation; beautifully situated on the Limmat, where it issues from the Lake of Zürich, and where it is joined by its tributary, the Sihl. It is one of the most prosperous manufacturing and commercial towns of Switzerland; yet the narrow streets and lofty houses of its older quarters, on the high ground e. of the river, give it the quaint appearance of a mediæval city. Of the many interesting old buildings the finest and most remarkable is the Gross Münster or Propstei, erected, one part 1090–1150, the other 1225–1300. Its chapter, reorganized at the Reformation, was suppressed 1832: the fine Romanesque cloisters still remain. The next most notable church is the Frau Münster or Abtei, founded for nuns 853, whose buildings mostly are of the 13th and 14th c. The most ancient parish church is St. Peter's, 13th c. The Wasserkirche (1479–84) is a church built on an old place of pagan sacrifice, the scene of the martyrdom of early Christians: in it has been housed since 1631 the city library, 120,000 vols., largest in Switzerland. There are extensive quays along the river and lake, several good bridges, and many institutions for charity.—Z. is one of the intellectual centres of Switzerland, and is noted for social activity and industrial enterprise. Its schools are numerous and of high grade. The univ., founded 1832–3, had (1886) 51 professors, 481 students, besides 65 special students.—The earliest inhabitants of the site of Z. were the lake-dwellers; after them were the Celtic Helvetians, who were succeeded by the Romans. Under the Roman rule Christianity was introduced in the 3d c. The 9th c. saw the development of Z. as a Teutonic town.—Cotton-spinning and making of machinery are extensive industries, but the most important business interest is the silk trade which was largely developed as early as the 12th c., and was revived near the end of the 17th c. by Huguenot and other Prot. refugees; and now employs nearly 20,000 hand-looms and about 5,000 steam-power looms—exporting annually silks to the value of more than \$15,000,000, mostly to France, the United States, and England.—The Prot. Reformation early gained solid footing in Z. through the efforts and influence of Zwingli (q.v.).—Pop. (1887) of the 'city' (the central portion) 27,638—of the 9 outlying townships 60,836—total 88,474; (1888) city 27,664; with suburbs (1901) 152,942.

**ZURUMA**, *sô-rô'mâ*, or **ZARU'MA**, *zâ-*: town of Ecuador, S. America; on the w. slope of the Andes, about 30 m. from the w. coast, and 90 m. s. of Guayaquil. It is in a mining district—its gold and silver mines having rendered it formerly very populous, but its importance has greatly declined.—Pop. about 6,000.

**ZUTPHEN**, *zût'fên*: fortified town in the Netherlands, province of Gelderland; beautifully situated on the right bank of the Yssel, where that river is joined by the Berkel, in a picturesque district of country, chiefly under cultivation, and variegated with abundance of wood. It is one of the oldest towns in the kingdom, but has many elegant modern buildings. The fortifications are promenades, from many points of which lovely prospects are obtained.

**Z.** is a station of the State railway from Arnhem to Friesland, and has extensive trade in wood, bark, and grain. There are factories for weaving and spinning; grain, wool, oil, and paper mills; many tanneries, a soap-boiling establishment, and a large carpet manufactory. The principal building is the Great Church, supposed to have been founded 1103; it and the Broederenkerk (Church of the Brethren) belong to the Reformed communion; the Rom. Catholics, Lutherans, and Baptists have each a church, and the Jews a synagogue. Besides good schools for the ordinary branches of education, there are a grammar school, school of design, a theatre, and a concert-hall. The town has charitable institutions for the sick, orphans, and old people; also the provincial lunatic asylum, which can receive 220 patients.—Pop. (1880) 14,822; (1887) 16,357.

At Rysselt, a village  $2\frac{1}{2}$  m. n. of **Z**, is a reformatory, the Netherlands Mettray, in which about 150 boys are educated and taught farm-labor and various handicrafts. It was founded by a private benefactor 1851, and has done much good. Nearly one-half of the boys have been withdrawn by their parents. The others obtain situations through the directors. The largest number have taken to farm-labor and gardening, for which the reformatory specially prepares them. Many have become soldiers and sailors; others smiths, house-painters, shoemakers, tailors, bakers, bricklayers, house-servants, etc. The institution is maintained by annual contributions, legacies, and a small charge for each boy. The receipts are about £3,500 annually, of which, on an average, a half is from legacies and contributions. The expenditure is about the same.

**ZVENIGORODKA**, *zvě-ně-gô-rôd'ká*: old town of Russia, govt. of Kiev; on the Tikritch, tributary of the Bug; about 98 m. s. of the town of Kiev.—Pop. 11,200.

**ZVORNİK**, *zvěr'nîk*: town of Bosnia (q.v.), which the Austrians, now administrating Bosnia, occupied 1878 after severe fighting; on the Drina, about 60 m. n.e. of Bosna-Serai. The town is strongly fortified, standing on the face of a steep hill, whose summit is a strong fortress commanding the valley of the Drina. It has several mosques, Greek and Rom. Cath. churches, lead mines, and a considerable trade in timber.—Pop. 2,512.



## ZWEIBRÜCKEN—ZWINGLI.

ZWEIBRÜCKEN: see DEUX-PONTS.

ZWICKAU, *tsvîk'kow*: picturesque, irregularly built, ancient-looking town of Saxony, in a pleasant valley on the left bank of the Mulde, 60 m. s.w. of Dresden. The river is crossed here by four bridges, two of iron. The town is the cap. of the circle of Z., and is the seat of a dist. court, court of appeal, and other public offices. Of its churches, most noteworthy is that of St. Mary, the finest Gothic edifice in the Erzgebirge, dating from 1453 (restored 1884), distinguished by its tall tower, from which is an extensive view; it contains a very fine altar-piece by the old German master Wohlgemuth, and other interesting works of art. There are also a splendid court-house and exchange; a cloth-hall; a district infirmary; a gymnasium, with library of 20,000 vols.; a burgher, Rom. Cath., trade, and other schools; an old castle, which has been converted into a work-house. The town is prosperous, and the population increasing. There are cloth manufactories, breweries, dye-works, chemical works, tanneries, oil and saw mills. The chief source of its wealth, however, and that of the neighboring villages, are the rich beds of coal in the surrounding district, which (1885) employed 10,000 hands. There are also large iron-works in the neighborhood. The town is connected by railway with Leipzig, Dresden, and other places, and has considerable transit trade. Pop. (1834) 6,701; (1880) 35,005; (1900) 55,830.

ZWINGLI, *zwîng'glê*, ULRICH (HULDREICH): one of the leaders in the Reformation: 1484, Jan. 1—1531, Oct. 11; b. Wildhaus, in the canton of St. Gall, Switzerland; one of eight sons of the amtmann of that place. He studied first at Berne; then at the Univ. of Vienna, where he applied himself to philosophy; and afterward at Basel, where, under the great Thomas Wyttenbach, he directed his attention to theology. Z. relates that Wyttenbach taught him that the death of Christ, and not masses, pilgrimages, and priests, took away the sin of the world; and that Holy Scripture, and not ecclesiastical tradition, was the rule of faith. He became pastor 1506 in Glarus. At this time his studies were chiefly in the Latin classics and the church Fathers; but having begun to learn Greek 1513, he from that time devoted himself to the New Testament. He wrote out the epistles of Paul in the original language, and learned them by heart, which was of great service to him afterward in his disputations. In the capacity of army chaplain, he attended the campaigns in Lombardy of the inhabitants of Glarus for the pope against the French, 1512, 13, and 15, for which service he received a pension from the pope till 1517. In 1516 the liberal-minded administrator, Geroldseck, invited him to be preacher in the convent of Maria-Einsiedeln, famous for the pilgrimages to the images of the Virgin and Child preserved there for a thousand years. Here Z. began to preach against many abuses prevailing in the church, especially the superstition of pilgrimages: he also called on the bishops of Sitten and Constance to bestir themselves for the improvement of the church under the guidance of the Word of

God. So little was he then suspected by the authorities of the Latin Church that the papal legate, Antonio Pulci, conferred on him, 1518, the diploma of chaplain to the Holy See; or was it indeed hoped by promotion to buy his silence? He was soon afterward called to Zürich; and he entered on his office as pastor in the great cathedral there, 1519, Jan. 1, with a discourse in which he declared himself for the pure gospel unfettered by glosses. In this office, to which was joined 1521 that of canon in the cathedral, he laid the foundation of his subsequent work as Reformer. The same cause that had stirred Luther into activity gave the impulse to Zwingli. In 1518 Bernardin Samson, a Franciscan from Milan, came to Switzerland to sell indulgences for the benefit of the papal court. Z., who was still in Einsiedeln on Samson's first appearance, opposed him both there and afterward in Zürich with the whole force of his pulpit eloquence, and succeeded so well that Samson was sent out of the town of Zürich by the council. From this time, Z., though attacked by the monks and many of his brother canons, advanced with rapid steps in his reforming career; for the magistracy of Zürich supported his measures to such a degree that, as early as 1520, they issued an order throughout their jurisdiction that the Word of God should be taught without human additions. In 1522 the Reformation was formally established in Zürich. At this time Z. wrote his first book against the fasts of the Roman Church; he also began to study the Hebrew language. The offers of high promotion made to him by Adrian VI. could not make him waver. In 1523, Jan., the government of Zürich invited all theologians disposed to enter the lists with Z. to a conference at Zürich, which was attended by 600 clergy and laity. Z. had arranged 67 theses as a summary of his doctrinal views, and defended them so ably against the attacks of the celebrated Joh. Faber, afterward bp. of Vienna, that the Council of Zürich declared in favor of Z.'s doctrines, and upheld him and his assistants in adhering to them. The second disputation, 1523, Oct., at which Z., before more than 900 people, spoke against the worship of images and the mass, was the cause of the removal of all pictures and statues from the churches of the city of Zürich and its jurisdiction; and this was followed 1524 by the abolition of the mass. In the same year Z. entered into the married state with Anna Rheinhard, aged 43, widow of a nobleman of the name of Meyer von Knonow. In the following year he published his creed, *Von der wahren und falschen Religion* (Of the True and False Religion). He had thus, in a few years, placed the work of reformation in his native land on a solid footing. He now pressed zealously forward in the same course; while the magistracy of Zürich, who all along actively supported him, abolished the begging friars, brought matters relating to marriage before the secular courts, and instituted a better management of church property. On a great many points Z. was at one with Luther and the other German reformers; but in liturgical matters he carried out his reform more



radically and rejected the dogma of the corporeal presence of Christ in the Lord's Supper. Z. was more firm and uncompromising than Luther in insisting on the supreme authority of Holy Scripture, and was less held by tradition and by the mediæval church. As to the Lord's Supper, his characteristic tenet was that it was not Christ's sacrifice in repetition, but the remembrance or commemoration in faith of that sacrifice; and as his idea of 'faith' included more than a mere belief or conviction, and made one of its chief elements to be a personal love to the Lord Jesus, his doctrine did not empty the Lord's Supper of its vital and spiritual meaning, as his opponents charged. In order to heal the breach that had, as early as 1524, broken out between the two parties of the new religion on the latter point, a meeting between the Saxon and Swiss Reformers was brought about by Philip, Landgrave of Hesse, at Marburg 1529. The conference lasted three days, but little progress was made toward unity of opinion: see SACRAMENTARIAN: LORD'S SUPPER, THE. In 1531 open war, which Z. had long foreseen, and of which he had warned his countrymen, broke out between Zürich on the one side and the Rom. Cath. cantons of Lucerne, Schwyz, Uri, Unterwalden, and Zug on the other; and Z., by command of the council of Zürich, took the field with the banner of the canton, which had always been borne by a priest. On Oct. 11 came the conflict; and as their opponents were more than double in number, and better led, the Zürichers were beaten, and Z. was among the fallen.—His collected works were published in Zürich 1545, in 4 vols.; a selection, in 2 vols., appeared 1819–21, edited by Usteri and Vögelin.—See the *Lives* by Rotermund (1818), Hottinger (1820), Christoffel (1857), and Mörikofer (1869).

Of all the reformers, there is none more fitted to excite our love and respect than Zwingli. He was a statesman as well as a theologian. Alone among the Prot. leaders he saw that the religious and the political questions of the time formed one and the same problem, and could not be well dealt with separately. Fearlessly honest in purpose; with a clear head and eye for the truth; less violent if less eloquent than Luther; more candid and open-minded if less systematic and penetrating in spiritual insight than Calvin; he stands before us quite as original if not as prominent as these reformers. His work was not so great as theirs, his influence not so extended; but his character was quite as genuine, and his labor, in some respects, quite as enduring.

ZWIRNER, *tsvîr'nér*, ERNST FRIEDRICH: German architect: 1802, Feb. 28—1861, Sep. 22; b. Jacobswald, Silesia. He studied in architectural schools at Breslau and Berlin; worked under Schinkel a few years; and built costly houses and churches in the vicinity of the Rhine. His most conspicuous work was on the cathedral of Cologne, which had been begun about 600 years previous. He built the transept, the splendid n. and s. portals, but died, in Cologne, before the towers were completed. See COLOGNE.

## ZWOLLE—ZYGOMATIC.

**ZWOLLE**, *zwöl'leh*: fortified town of the Netherlands, cap. of the province of Overijssel; on the Zwarte Water, and by the canal called the Willemsvaart has connection with the Yssel. It is one of the finest towns in the kingdom, having many beautiful private and public buildings. Both within and without the gates are pleasant promenades and drives, shaded by large trees. The surrounding country consists of rich meadows and cultivated fields, adorned by pretty country-seats. Z. has three extensive suburbs—Diezenpoorten, Kamperpoorten, and Sassenpoorten. It is most favorably situated for commerce, having, by navigable waters and railways, communication with the provinces around the Zuider Zee, Hanover, England, and other maritime nations. The trade in farm-produce and stock is very great. Principal industries are shipbuilding, tanning leather, rope-spinning, beer-brewing, soap-boiling, weaving calicoes and stockings, book and plate printing, making salt, cooperage, and refining sugar. The most important buildings are the Town House, Palace of Justice, and Great Church. There are many excellent charitable institutions; and besides those for the ordinary branches of education, a flourishing grammar school, in which Pope Adrian VI. was partly educated; and a school of design. Z. has a cabinet of nat. history, and a literary and a musical soc. Here the poet Rhynvis Feith (1753–1824) was born, and here Thomas à Kempis lived 71 years.—Pop. (1815) 12,870; (1880) 22,760; (1887) 25,055; (1901) 31,277.

**ZYGAPOPHYSIS**, n. *zīg'a-pŏf'ī-sīs* [Gr. *zugon*, a yoke; *apŏphŭsis*, the process of a bone]: a yoke-piece; one of the articulating processes of the vertebra.

**ZYGO-**, prefix, *zī-gō-* [Gr. *zugon*, a yoke]: yoked; joined; having processes more or less resembling a yoke.

**ZYGOMATIC**, a. *zīg'ō-măt'īk* [Gr. *zugōma*, the zygomatic arch—from *zugon*, a yoke]: pertaining to the **ZYGOMA**, *zī-gō'ma*, a bony arch of the upper part of the side of the face; pertaining to the cheek-bone.



## ZYGOPHYLLACEÆ—ZYMOSIS.

**ZYGOPHYLLACEÆ**, *zī-gō-fil-lā'sē-ē*: the Bean-caper family, a nat. order of exogenous plants, allied to *Rubiaceæ*, and containing about 100 known species, herbaceous plants, shrubs, and trees, natives chiefly of subtropical countries. They have opposite, generally pinnated leaves, without stipules. The flowers are solitary, or two or three together; the calyx 4-5-parted; the petals alternate with the calycine segments, and clawed; the stamens twice as many as the petals, generally rising from the back of small hypogynous scales; the ovary simple, 2-5-celled, with two or more ovules in each cell. The fruit is capsular, rarely somewhat fleshy, with four or five angles or wings. The most important genus is that of *lignum-vitæ*, *Guaiacum* (q.v.). The abundance of species of *Zygophyllum* and some other genera constitutes one of the most striking features of n. African and Arabian deserts. The flowers of *Z. fabago* are employed as a substitute for capers, under the name of *Bean-capers*. Those of *Melianthus major*, in the Cape of Good Hope, abound in honey. The leaves of some species are used in the W. Indies to scour floors. The Turks use the seeds of *Peganum harmala* both as a spice and for dyeing red.

**ZYGOSPORE**, n. *zīg'ō-spōr* [Gr. *zugon*, a yoke; *spōra*, seed]: a spore formed by the conjugation and coalescence of two cells.

**ZYME**, n. *zīm* [Gr. *zumē*, leaven]: in *pathol.*, a word used to refer to the poisonous cause of zymotic diseases.

**ZYMIC**, a. *zīm'ik*, or **ZUMIC**, *zūm'ik* [Gr. *zumē*, leaven]: produced by fermentation.

**ZYMO-**, prefix, *zī-mo-*: connected with or producing fermentation.

**ZYMOLOGY**, n. *zī-mōl'ō-jī* [Gr. *zumē*, leaven, ferment; *logos*, discourse]: the doctrine of fermentation. **ZYMOMETER**, n. *-ē-tēr*, or **ZYMOSIMETER**, n. *zī-mō-sīm'ē-ter* [Gr. *zumōsis*, fermentation; *metron*, a measure]: an instrument for ascertaining the degree of fermentation that has taken place in fermenting liquids.

**ZYMOMETER**, n. *zī-mōm'ē-tēr* [Gr. *zumē*, leaven; Eng. *meter*—from Gr. *metron*, a measure]: instrument for ascertaining the degree of fermentation in fermenting substances.

**ZYMOSCOPE**, n. *zī'mo-skōp* [prefix *zymo-*; Gr. *skopeō*, I see, I observe]: in *chem.*, an instrument contrived by Zenneck for testing the fermenting power of yeast, by bringing it in contact with sugar-water, and observing the quantity of carbonic anhydride evolved.

**ZYMOSIS**, n. *zī-mō'sīs* [Gr. *zumōsis*, fermentation—from *zumōō*, I cause to ferment—from *zumē*, leaven]: in *med.*, a morbid action or condition, as of the blood, supposed to be allied to fermentation. **ZYMOTIC**, a. *zī-mōt'ik* [Gr. *zumōtīkōs*, promoting fermentation]: pertaining to or caused by fermentation. **ZYMOTICALLY**, ad. *-ī-kāl-lī*.

## ZYMOTIC DISEASES.

**ZYMOTIC DISEASES:** large class of contagious diseases supposed to be caused by reception into the system of a virus which acts as a ferment; the entire class of epidemic, endemic, and contagious diseases (see *NOSOLGY*). The word *Zymotic* is employed to class together all the diseases characterized by the property of suddenly attacking large numbers of people. These diseases are characterized by a regular progress and duration of symptoms, and are supposed to be due to some germinative matter which ferments or multiplies in the system especially during a so-called period of 'incubation' before the disease manifests itself. In the classification of Dr. William Farr, adopted substantially by the U. S. census and by boards of health, the class includes: Order 1—miasmatic diseases, viz., small-pox, varioloid, measles, whooping-cough, typhus fever, typhoid fever, erysipelas, carbuncle, dysentery, diarrhea, cholera morbus, cholera, cholera infantum, enterocolitis, cerebro-spinal meningitis, intermittent fever, yellow fever, pyæmia, and septicæmia; Order 2—enthetic and inoculated diseases, viz., syphilis, malignant pustule, gangrene, and hydrophobia; Order 3—dietetic diseases, viz., inanition, dyspepsia, scurvy, purpura, and alcoholism. Zymotic are distinguished from other classes of diseases, such as constitutional, or local, or developmental, etc.

It must not be assumed from the origin of the word [from the Greek *zymē*, a ferment] that all the so-called zymotic diseases are true fermentations, for the class is intended to comprehend all the principal diseases which have prevailed as *epidemics*: they may be subdivided according to their causes, as due to *malaria*—in which case the diseases are endemic—to *specific disease poisons* communicable either by direct contact or by the indirect channels of air, water, etc.; to *parasites*; or to *scarcity* or *inferior quality* of food; or in other words *Miasmatic*, *Enthetic*, *Parasitic*, and *Dietic* disorders.

The causation of the two latter is easily grasped, and can in every case be traced. But in the two former it is not always clear. According to the Germ-theory (q.v.) of infectious diseases, the origin *de novo* of a fever poison is as impossible as the production of a man or a dog without parents. Day by day we observe the discovery of one after another of the septic organisms causing disease, and it is but natural to conclude that after a time all the specific causes of the diseases referred to will have been traced. It is urged by those who oppose the germ-theory that there must have been at some time a spontaneous origin of the poisons, and that there still may be. This argument, however, has no weight. The question of the origin of the first contagium is to pathology what the 'origin of species' is to physiology. The pathologist who is investigating the causation of specific diseases is no more to be troubled with the former problem, than the biologist who is studying the phases of embryonic development should be with the latter. It has long been known that infectious diseases differ greatly in infectiveness. Few of the highly infectious diseases have at any time been supposed to arise *de novo*,



## ZYMURGY.

but some of the less infectious—e.g., typhoid fever—are still in certain quarters said to be of spontaneous origin, and due to the decomposition of excrementitious matters. But those who hold such a view must show in what way the decomposing matter acts. Common septic bacteria, we know, cause diarrhea, but they do not cause typhoid fever. A case of this fever, let us suppose, occurs in a small community. To all appearance the conditions of the place are unchanged, and the house effected does not differ from its neighbors. How is it to be explained according to the spontaneous origin theory? In such cases it seems to be forgotten by what subtle channels contagium may be carried; further, the fact is overlooked that the stage of incubation in such diseases is indefinite, and that a chance visitor may have left the poison behind, while apparently in good health. Every case of a specific fever can be traced by patient search to infection.

The prevalence of certain infectious maladies, especially of fevers common in childhood, is, according to Dr. Wilson, 'in great measure attributable to the culpable neglect arising from the popular belief, amounting almost to fatalism, that children must contract them sometime, and that there is therefore little use in endeavoring to take any protective steps where the disease is epidemic. The consequence is that the epidemic continues to spread so long as susceptible victims are to be found in the community, and only dies out for a time when almost all these have been attacked.' And it has been stated by high authority that the deaths are a third more numerous than they would be if the existing knowledge of the chief causes of disease were reasonably well applied throughout the country; and that of the cases of preventable sickness which thus in every year attain their final place in the death-register, each unit represents a group of other cases in which has occurred preventable disease, not ending in death, though often of far-reaching ill effects on life. It further has to be remembered, as of legislative concern, that the physical strength of a people is an essential factor of national prosperity; that disease, so far as it affects the workers of the population, is in antagonism to industry; and that disease which affects the growing and reproductive parts of a population tends to the deterioration of the race. For the most important of the laws by which zymotic poisons are governed, see VIRUS.

ZYMURGY, n *zīm'ér-jǐ* [prefix *zymo-*; Gr. *ergon*, work]: that department of technological chemistry which treats of the scientific principles of wine-making, brewing, distilling, and the preparation of yeast and vinegar—processes in which fermentation has the principal part.









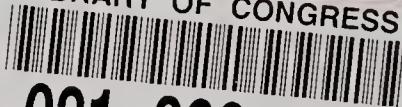








LIBRARY OF CONGRESS



0 021 866 777 6